Instruction Manual

FOR THE

FALCON 6/300

Refrigerated

CENTRIFUGE

READ BEFORE USE!

Models **MSB300.CR3.I**
MSB300.CR4.I

SMAMSB.3R1.9
ISSUE 0
9804

MSE (UK) LTD
Health and Safety at Work

MSE (UK) Ltd is required under the Health and Safety at Work Act, 1974 and other UK legislation as designers, manufacturers, suppliers and importers of articles for use at work to ensure that, as far as is reasonably practicable, articles which we design, produce, supply or import are safe and without risk to health.

We are required to provide information on the safety and handling precautions to be observed when installing, operating, maintaining and servicing our products. Such advice is contained in this manual.

We are also obliged to update this information should circumstances change and to operate a system to this end.

We should also like to point out, however that **you as users have an important responsibility in the provision and maintenance of safe working practices and conditions.**

Accordingly, we draw the following matters to your attention:

1. **This apparatus should only be used as intended and within its design parameters by suitably qualified and trained personnel who have read and understood the relevant sections of this manual.**
2. **This manual should be readily available to such personnel at all times.**
3. **In addition to that which is written in the manual, normal common-sense safety precautions must be taken at all times to avoid the possibility of accidents. Particular care is required when working with apparatus at high temperature or pressure.**
4. **Installation, maintenance, repairs and servicing should only be carried out by an MSE (UK) Ltd approved engineer, and connection to electrical supplies should only be carried out by suitably trained personnel.**

TECHNICAL SUPPORT, WARRANTY SERVICE AND MAINTENANCE

UK customers; if you are in any doubt whatsoever regarding the correct use of this apparatus, or if you require any technical data or assistance, please contact the MSE (UK) Ltd Technical Support Department at:

MSE (UK) LTD

Worsley Bridge Road
Lower Sydenham
London, SE26 5AZ

Telephone **+44 (0) 870 609 4097**
Fax **+44 (0) 208 650 8408**
E-mail: **sales@mseuk.co.uk**
Web Page: **www.mseuk.co.uk**

OVERSEAS CUSTOMERS: Should contact their local MSE (UK) Ltd distributor, details can be found on our website.

ELECTRICITY SUPPLIES: Voltage and frequency
MSE (UK) Ltd electrical apparatus is offered and labelled for one, or for a choice of two or more voltage ranges and, where necessary, different frequencies of mains supply. MSE (UK) Ltd does not accept any responsibility for the operation of any such apparatus should it be connected to electricity supplies which are normally outside, or vary outside, the stated voltage and frequency values for which it is designed, nor for any consequential loss, damage or injury, howsoever caused.

Read This Before Use!

Thank you for buying a **MSE (UK) Ltd Falcon 6/300 Centrifuge**. Please read this operating manual before using your centrifuge; it will provide you and your colleagues with useful information on all aspects of the equipment. As our customer, we should like to ensure that you are totally satisfied at all times. Do not hesitate to contact us.

Your views are very important to us.

MSE (UK) Ltd PRODUCT WARRANTY

Terms and Conditions

We hope that you do not have the need to use the extensive warranty cover that MSE (UK) Ltd extends to you. However should you have a problem, our prompt response is greatly helped if you have filled in and posted the pre-paid Warranty Registration Card supplied with your new equipment.

MSE (UK) Ltd gives a one-year warranty from the date of delivery. During this period, component parts proven to be defective in materials or workmanship will be repaired or replaced at our expense. Installation, commissioning and calibration are not covered by this warranty agreement. The MSE (UK) Ltd approved service agent must be contacted for warranty determination and direction prior to any work being carried out.

These warranties are only applicable to new products and not second hand nor refurbished products even if repaired by MSE (UK) Ltd. Any such products are covered by separate warranty terms and conditions which will be made available on request.

Replacement or repair of component parts or equipment under this warranty shall not extend the warranty to either the equipment or the component part beyond the original one year warranty period unless agreed in writing by MSE (UK) Ltd.

The above warranties are extended to the original purchaser upon full invoice payment. A purchase receipt or other proof of purchase may be required before warranty service will be performed. These warranties only cover failures due to defective workmanship which occur during the normal operation of the product by the original purchaser, and not failures which result from accident, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, electrical power fluctuations, dust, or other environmental extremes, modification or service other than by an approved service agent or following the written authority of the manufacturer, or damage that is attributable to acts of God. Expendable items such as motor brushes, door seals, lid seals, "O" rings or lamps are excluded.

MSE (UK) Ltd, or its approved service agent, reserves the right to repair defective equipment on the premises of the customer, or at a service station, at the sole discretion of MSE (UK) Ltd or their approved agent. In the event of return to an approved service centre the customer is responsible for the safe packaging of the instrument and notification to the service centre. Neither MSE (UK) Ltd nor its agents are responsible for any damage occurring during shipment.

Specification and Material Changes:- MSE (UK) Ltd reserves the right to supply our latest and improved models at time of shipment.

Taxes:- The prices quoted do not include any taxes imposed by the State or Country in which the purchase was made.

Installation:- Installation of all equipment shall be by, and at the expense of the purchaser unless stated otherwise. Access to the site, and the provision of required utilities e.g. Power, water and drainage to suitable connections, will be the responsibility of the purchaser, and at the purchaser's expense.

Limitation of liability:- In no event, whether as a result of breach of contract or warranty, shall MSE (UK) Ltd be liable for any consequential or incidental damages including, but not limited to, loss of profit or revenues, loss of use of the equipment or any associated equipment, down time costs, costs of substitute equipment, costs of labour, costs due to delays or claims of purchaser's own customers for such damages. The purchaser agrees to indemnify MSE (UK) Ltd and to hold them harmless from any and all liability, claims, demands, actions, suits, expenses or costs, including attorney's fees relating to such consequential or incidental damages.

All expressed and implied warranties, including the warranties of merchantable quality and fitness for a particular purpose, are limited to the application period of one year.

Validity:- Legal rights vary from country to country and states within countries, so some or all of the exclusions or limitations listed above may not apply, but if any part of these conditions shall be found to be unenforceable it shall not affect the validity or enforceability of the remainder of the conditions.

ELECTRICITY SUPPLY

Before connecting this apparatus to the electricity supply, check the information given on the rating plate and ensure that;

A) Your supply is single phase a/c (alternating current) of the stated frequency with neutral nominally at earth potential.

B) Your supply voltage is within the stated range.

C) The current rating is within the capacity of your outlet.

D) Your plug or electricity supply circuit is fitted with a suitable fuse.

Fuse rating	**110v-120v**
	Not applicable

WARNING! This apparatus must be earthed.

The wires in the mains lead are coloured in accordance with the following code;

Live	Black
Neutral	white
Earth	Green

Connect the wires to a non-reversible 3-pin plug as follows:-

Green and Yellow to terminal marked E (Earth), G (Ground), coloured Green or Green and Yellow or marked with the Earth symbol.

White wire to terminal marked N (Neutral) or Common.

Black wire to terminal marked L (Live) or Phase.

IMPORTANT Consult an electrician if in any doubt or if your supply system has any of the following:

No earth
A colour code different from above
Reversible plugs
Supply and return leads that are both above earth potential.

NOTE: Always switch off at the socket outlet before removing plug. If no switch then ensure fingers do not touch plug pins within 2 seconds of plug removal.

1. INTRODUCTION TO YOUR CENTRIFUGE 8
2. GENERAL DESCRIPTION 13
2.1 Centrifuge Specification 14
3. INSTALLATION 15
3.1 Connecting the power supply 16
3.2 Centrifuge restraint 16
3.3 Accessories supplied with each centrifuge 16
4. THE CONTROL PANEL 17
4.1 Set Keys 19
4.2 Operation Keys 20
5. OPERATION 22
5.1 Setting run value 23
5.2 Run procedure 23
5.3 Examination of set values 24
5.4 Changing set values 24
5.5 Changing from time to time hold 24
5.6 Changing between SPEED and RCF modes 24
5.7 Precool facility 24
5.8 Programmes 25
5.9 Saving a programme 25
5.10 Recalling a Stored Programme 26
5.11 Stop procedure 26
5.12 Power failure 25
5.13 Opening lid during power failure 26
6. PROGRAMMING EXAMPLES 27
6.1 How to enter a new program 27
6.2 How to copy an existing program 29
7. EXPLANATION OF ERROR MESSAGES 29
7.1 Critical System Errors 29
7.2 Uncritical System Errors 32

8. ROTORS 36

8.1 Installation of Rotor 36
8.2 Removal of Rotor 36
8.3 Loading the Rotor 36
8.4 Balancing the rotor 36
8.5 Critical Speeds 37
8.6 Materials with specific gravity in excess of 1.2 37
8.7 Spillages 37
8.8 Corrosive materials 37
8.9 Infective samples 38
8.10 Servicing 38

9. ROTOR AND ACCESSORY TABLES 39

9.1 Table 1 Swing-out rotors 40
9.2 Table 2 Angle rotors 42

10. MAINTENANCE 44

10.1 Resetting the Thermal Fuse 44
10.2 Cleaning 44
10.3 Disinfecting 44
10.4 Drive shaft 44
10.5 Rotors and buckets. 45
10.6 O-Rings. 45
10.7 Sterilisation 45
10.8 Lid seal 45
10.9 Detection of Corrosion 45

11. SERVICE INSTRUCTIONS 46

ILLUSTRATIONS

Figure 1 11

Figure 2 12

Figure 3 13

Figure 4 Recommended clearances 16

Figure 5 Suggested Restraint System 17

Figure 6 Main Control Panel Refrigerated 18

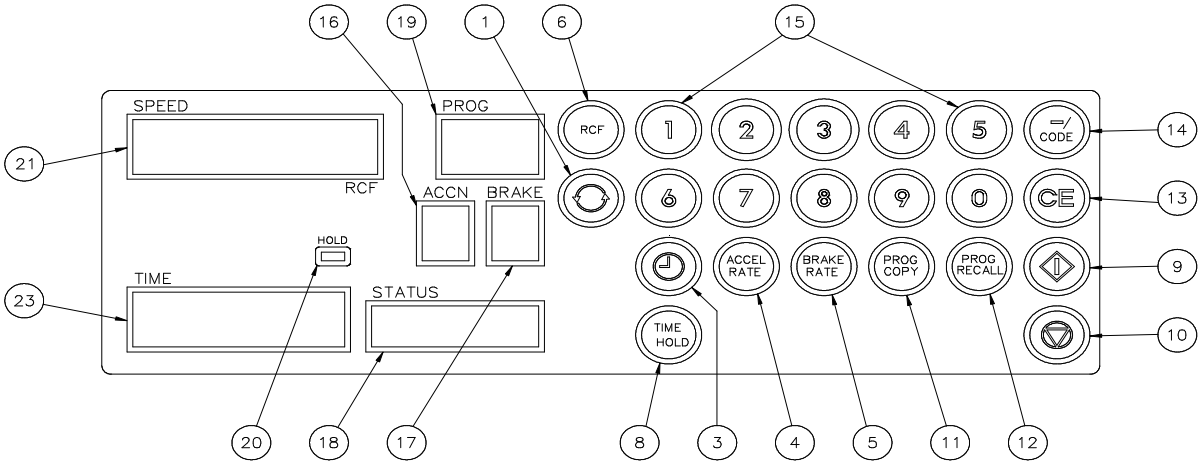


Figure 7 Main Control Panel Air Cooled 18

1. INTRODUCTION TO YOUR CENTRIFUGE

The FALCON 6/300 performance bench top centrifuge joins the well established range of MSE centrifuges.

The MSE range now consists of

MICRO-CENTAUR PLUS

KESTREL

HAWK 15/05 REFRIGERATED

CENTAUR 2

HARRIER 15/80

HARRIER 18/80 REFRIGERATED

HARRIER PLUS

CELLSEP

SONIPREP PLUS

The entire MSE range of centrifuges has been designed to meet the present and future demands of routine research laboratories.

A comprehensive range of rotors and accessories are available to accommodate the most commonly used centrifuge tubes and bottles.

In the FALCON 6/300 MSE have utilised the best of current technology to produce the most advanced, safe and reliable instrument possible.

Advanced design features include:-

- INTELLIGENT MICROPROCESSOR CONTROL
- LED DISPLAY / TACTILE CONTROL PANEL
- INVERTER CONTROLLED BRUSHLESS MOTOR
- AUTOMATIC ROTOR IDENTIFICATION SYSTEM
- LAST RUN RECALL
- OVERSPEED PROTECTION
- FULL LID INTERLOCK
- IMBALANCE MONITOR
- SELF DIAGNOSTIC DISPLAY
- TEMPERATURE CONTROL
- SIMPLE TO USE
- EASY SERVICING
- KEY PAD LOCK

- PROGRAMMABLE RUN
- *REFRIGERATION
- *PRECOOL FACILITY

*Falcon 6/300 refrigerated only

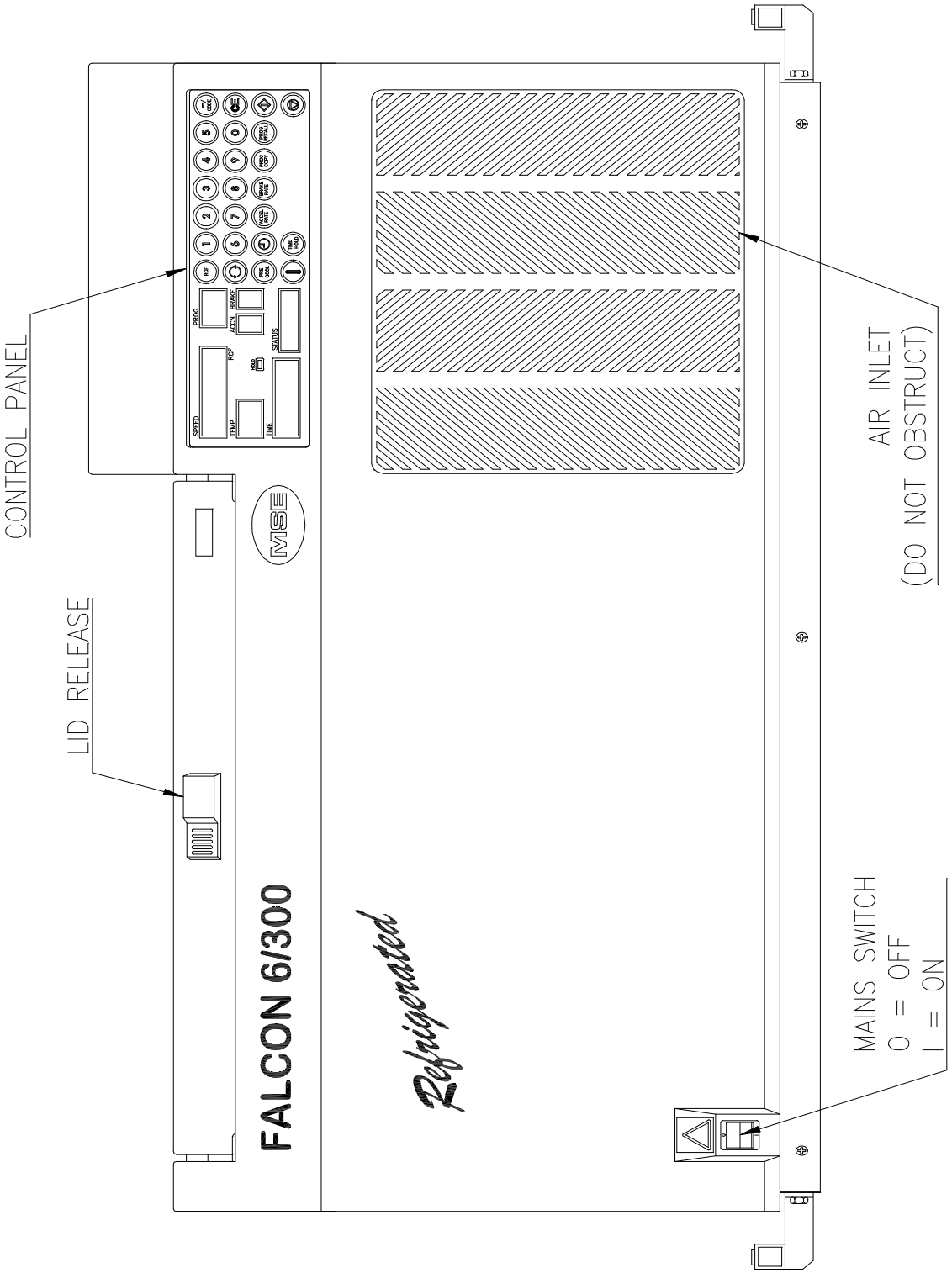


Figure 1
Front view of Falcon 6/300 Refrigerated

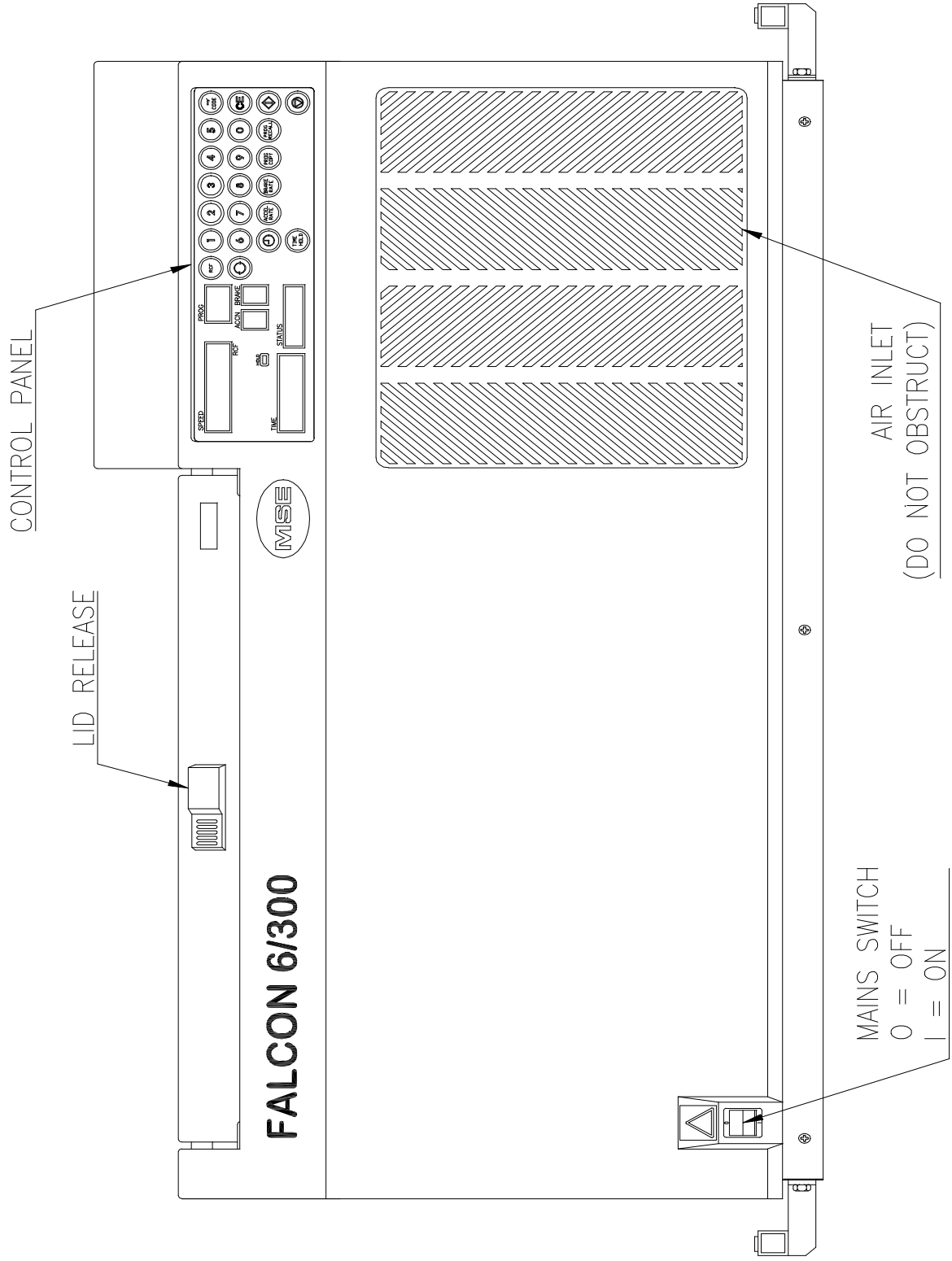


Figure 2
Front view of Falcon 6/300 Air cooled

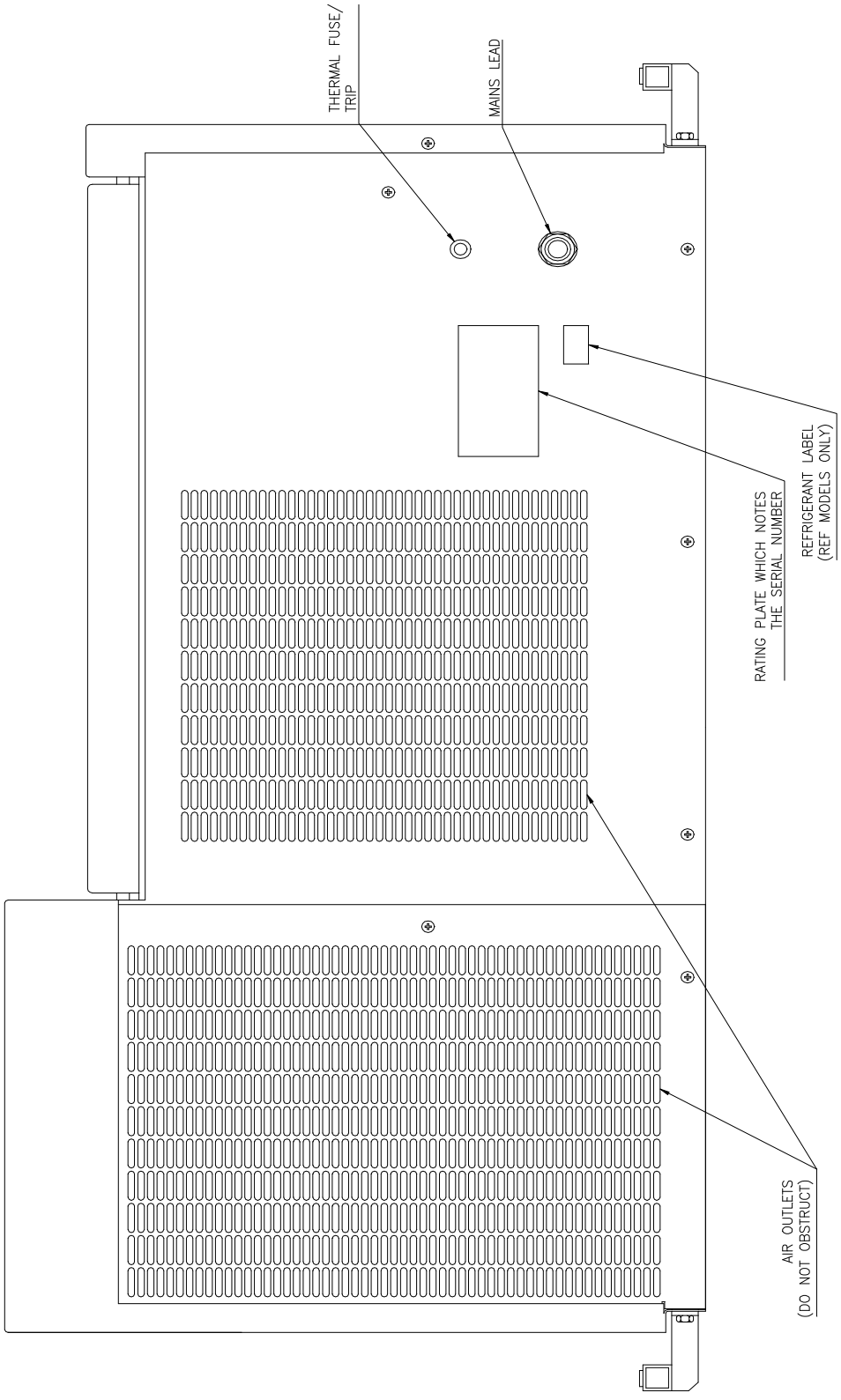


Figure 3
Rear view of Falcon 6/300

2. GENERAL DESCRIPTION

The Falcon 6/300 is a compact, large capacity, bench-top centrifuge with brushless motor, and incorporates microprocessor control, the functions of which are programmable from the key pad on the display panel.

In the event of a malfunction a diagnostic indication will be displayed and the rotor is automatically allowed to come to rest.

This unit complies with:
EMC – Emissions Standard EN 50081-1
Immunity Standard EN 50082-1
USA FCC Part 15
Canada CSA 108.8M

Designed for CSA approval to the following standards:

CAN/CSA C22.2 NO. 1010.1-92
CAN/CSA C22.2 NO. 1010.2.020-94

Also incorporated is a small window in the lid for independent speed sensing using optically coupled tachometer.

2.1 Centrifuge Specification

	Refrigerated	Non Refrigerated
Power supply options	120v 60Hz single phase	120v 60Hz single phase
Power consumption at full load (Acceleration power shown in brackets)	120v - 2100 watts (2400 watts)	120v - 1500 watts (1800 watts)
Time DISPLAY/RANGE	0 - 59 minutes 59 seconds 1 hour - 99 hours 59 minutes or Time Hold	0 - 59 minutes 59 seconds 1 hour - 99 hours 59 minutes or Time Hold
Timing Accuracy	0.1 second	0.1 second
Speed range	up to 6,000 rpm	up to 6,000 rpm
Speed control accuracy	± 10 rpm	± 10 rpm
Speed DISPLAY	± 20 rpm	± 20 rpm
Speed SETTING increments	1 rpm	1 rpm
RCF range	up to 7,194g	up to 6,030g
RCF SETTING increments	1g	1g
Temp range	0 to 40°C*	–
Temp accuracy	± 2°C	–
Precool	-9 to ambient	–
Acceleration rates	10 off	10 off
Brake rates	10 off	10 off
Dimensions	Height 433 mm Width 826 mm Depth 600 mm (not including mains cable) Weight 146 kg	Height 433 mm Width 826 mm Depth 600 mm (not including mains cable) Weight 121 kg
Standard operating conditions	Atmospheric pressure 950-1015 mbar (13.78 - 14.71 psi) Ambient temperature +10℃ to +30℃ Max. operating temperature +35℃ Humidity up to 70% RH non condensing	Atmospheric pressure 950-1015 mbar (13.78 - 14.71 psi) Ambient temperature +10℃ to +30℃ Max. operating temperature +35℃ Humidity up to 70% RH non condensing

* Selectable range is dependent on rotor speed and ambient temperature. With the 4 x 750ml windshield the maximum speed at which the temperature is controllable across the entire range is 5300 rpm.

3. INSTALLATION

In order to install the Falcon 6/300 these procedures should be followed.

Remove the centrifuge from its packaging and place it on a rigid, level surface. **DO NOT LIFT THE CENTRIFUGE BY THE LID.** The location of the keyboard, display, air inlet, lid lock access hole, and the release handle are shown in Figures 1 and 2 which are on pages 10 and 12. The location of the serial number label, power switch and fuses are shown in Figure 3 on page 12.

IMPORTANT: THE ROTOR MUST NOT BE FITTED WHEN MOVING THE CENTRIFUGE OR DURING TRANSIT.

Check that the available power supply corresponds to that stated on the rating plate located at the rear of the instrument.

If the suggested restraint system (see “Centrifuge restraint” section 17) is not used to secure the centrifuge on the bench then, it is the recommendation of CAN/CSA C22.2 No. 1010.2.010-94 that a clearance of 300 mm is allowed around the base of the centrifuge when in the final operating position.

NOTE: Laboratory management procedures should require that no person or any hazardous materials are within a 300mm boundary while the centrifuge is operating.

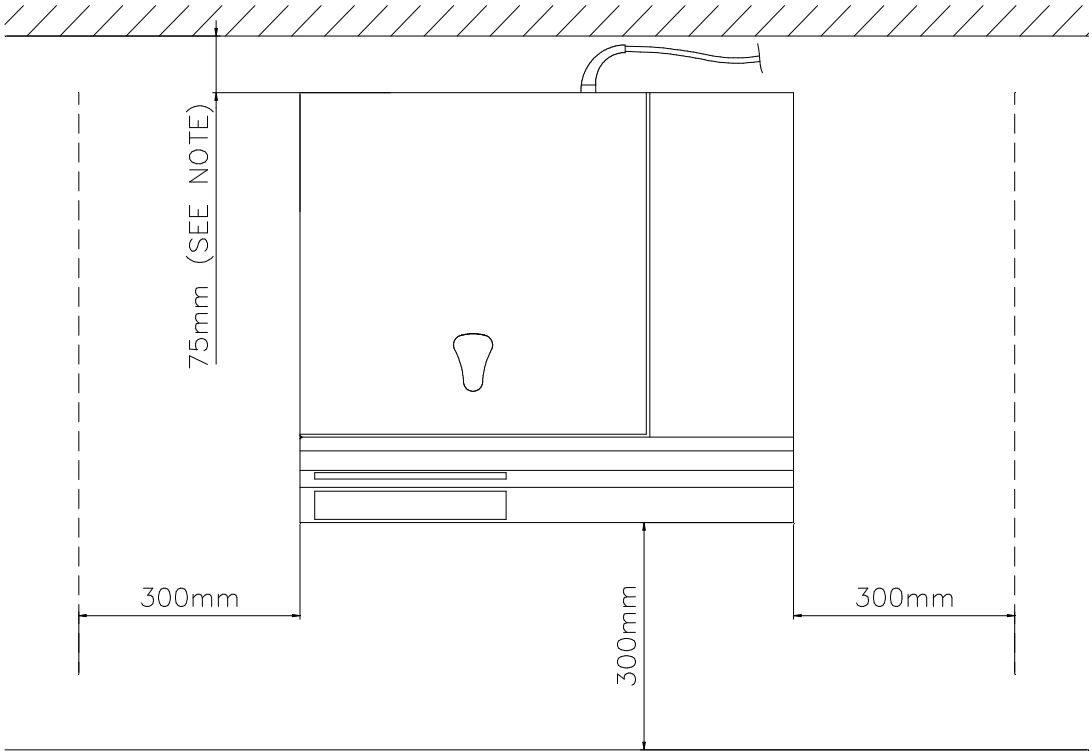


Figure 4 Recommended clearances

Note: 75mm if solid surface (i.e. wall) otherwise 300mm

3.1 Connecting the power supply

120v centrifuge - supplied with fitted plug.

3.2 Centrifuge restraint

A suggested restraint system, part number SG.66500.1214, which secures the centrifuge to a sound work surface, is shown in Figure 5 below. It consists of 4 anchor brackets, positioned at each corner of the centrifuge base, which are bolted or screwed to the work surface.

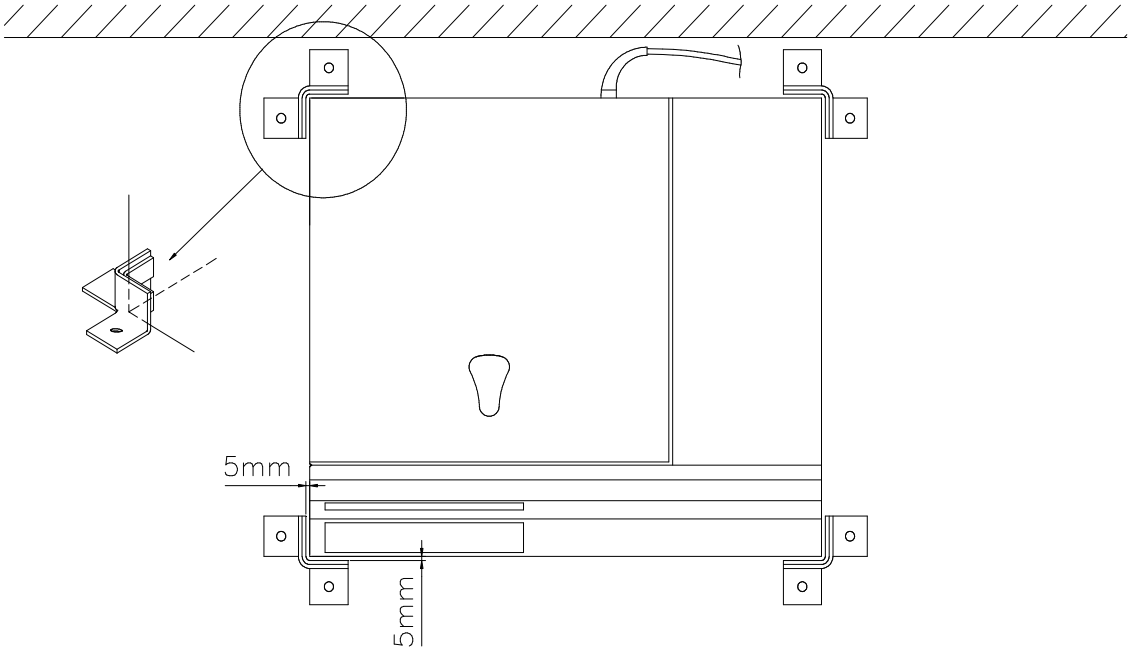


Figure 5 Suggested Restraint System

3.3 Accessories supplied with each centrifuge

Description	Quantity	Part No.
Emergency over-ride key	1	76600.004
Guarantee card 120v/230v	1	71100.958
Operating manual	1	71100.1408
Rotor spanner	1	96500.384AD

4. THE CONTROL PANEL

The keypad has keys for setting variables, entering numbers and initiating functions. The main control panel keys are itemised below:

1.Set Speed
2.Set Temperature
3.Set Time
4.Set Acceleration Rate
5.Set Brake Rate
6.Display RCF
7.Precool
8.Time Hold
9.Start
10.Stop
11.Program Copy
12.Program Recall
13.Cancel Entry
14.Special Key Functions
15.Numeric Keys 0 to 9
16.Acceleration Display
17.Brake Rate Display
18.Status Display
19.Program Number Display
20.Time Hold In Progress Indicator
21.Speed/RCF Display
22.Temperature Display
23.Time Display

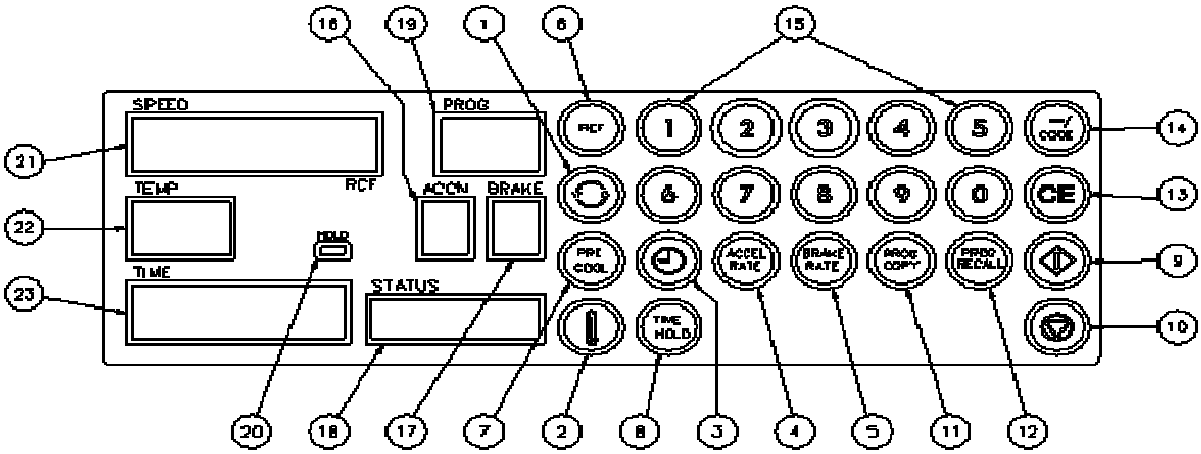


Figure 6 Main Control Panel Refrigerated

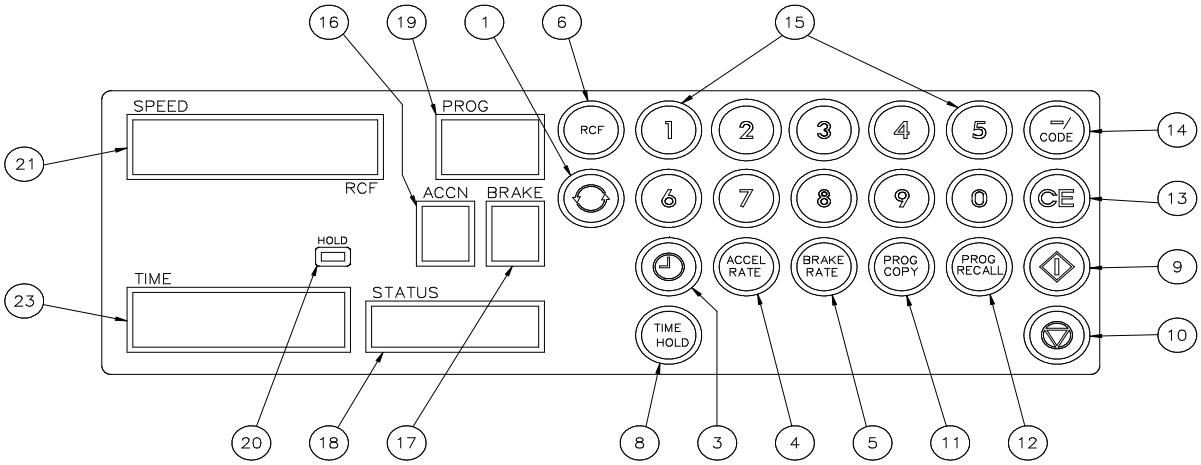


Figure 7 Main Control Panel Air Cooled

The function of each key on the main control panel and their associated displays are described on the following pages:

4.1 Set Keys

The set function keys are used to change the set values of speed, RCF, temperature, time, acceleration rate and brake rate.

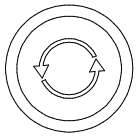
The set keys all work in the same manner. When the set key is pressed the set mode for that variable is entered and the appropriate display will go blank except for a flashing underscore in the least significant digit.

The required value must then be entered using the number keys which will replace the underscore and scroll right to left as each digit is entered. The number will continue to flash until the set key is pressed again to finalise the change.

The parameters and displays that can be changed by the set keys are described below.

NOTE: Set keys have to be pressed again to set.

Set Speed

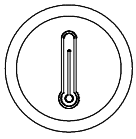


The speed is displayed on a five digit display showing rotor speed in revolutions per minute to ±10 rev/min. This display will show the set speed when the rotor is stationary and the actual speed when the rotor is running.

If the set speed key is pressed during a run it will display the set speed for

5 seconds then automatically revert back to the actual speed.

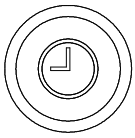
Set Temperature



The temperature is displayed on a two digit display showing the bowl temperature in degrees centigrade over a range of -9°C to +40°C.

If the set temperature key is pressed when the refrigeration process is on it will display the set temperature for 5 seconds then automatically revert back to the actual temperature.

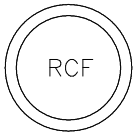
Set Time



When the machine is running the time is displayed on a four digit display showing the time in either hours and minutes, when the time to be displayed is greater than, or equal to 1 hour, or minutes and seconds when the time to be

displayed is less than an hour. When the machine is in stationary mode the time display will be hours: minutes.

Set RCF



The RCF is displayed on a five digit display, showing the set value when the rotor is stationery, and the actual value when the rotor is running. If the set RCF key is pressed during a run it will display the set RCF value for 5 seconds and then automatically revert back to the actual RCF value.

The actual value can only be displayed when the rotor has been identified which is during a run when the speed is greater than 250 rev/min.

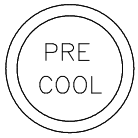
Set Acceleration and Brake Rate

There are two single digit displays one for the acceleration rate and one for the brake rate. The available rates are 0 to 9.

4.2 Operation Keys

The operation keys are those used to make the unit perform one of the following functions: - Precool, Time hold, Start, Stop, Program Copy, Program recall, Cancel entry. The individual functions of the operation keys and their associated displays are described below:-

Precool

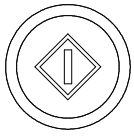


The precool key turns on the refrigeration when the rotor is stationary so that the bowl can be brought to the set temperature before a run.

Time hold

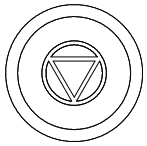
The time hold key puts the unit into time hold mode when the rotor can be started and will run until the operator presses the stop button. The time hold indicator will illuminate to show this mode is active. The time display will count up from zero.

Start



The start key is used to start a run.

Stop



The stop key is used to stop a run, or truncate and save a program.

Program Copy

An existing program can be copied from one program number to another by pressing the copy program key followed by the new program number where you would like to put the copy.

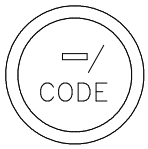
Program Recall

The program recall function is used to call up an existing program for use. When the key is pressed the program display goes blank with a flashing underscore in the least significant digit. Press the program number required, and then press again to enter the program.

Cancel Entry

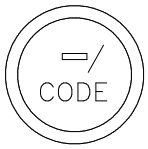
The cancel entry key is used to cancel an error, mute the bleeper or clear a display in the set mode so that a new value can be entered.

Special Function Keys



Keypad Inhibit
Pressing the decimal point followed by the 3 digit number code 1,2,3 will inhibit all keypad functions with the exception of STOP when the rotor is running, and PROG RECALL, START and PRECOOL when the rotor is stationary. To cancel press decimal point and 1,2,3 again.

Rotor Run Timer
This timer keeps a record of the number of hours the rotor has been running. The time is accessed by pressing the copy key followed by the numbers 4,5 6, this will be displayed until it is cancelled by pressing

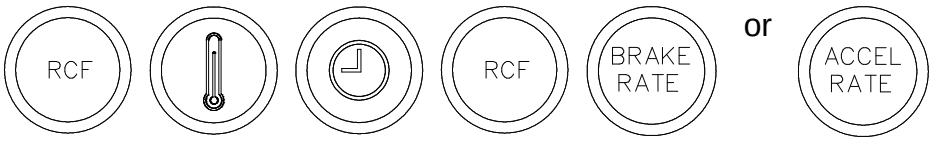


and then 4 5 6 again.

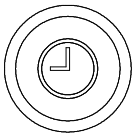
Status Display
The Status Display is used to communicate the current state of the machine to the user. The display gives the highest priority message information at the time. The system errors have the highest priority followed by the operator errors, then the system status information.

5. OPERATION

5.1 Setting run value

Press 

Enter the required value for the function selected using the numeric keypad. Repeat above until all run values required have been accepted.

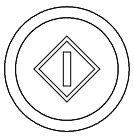
If a timed run is not required press 

The following table shows the digit display range.

	Max. Digits	Allowed range
Speed	4	200 to 6,000 rev/min
Temperature	2	-9ºC to 40ºC
Time	3	1 second to 59 minutes 59 seconds or 1 minute to 99 hours 59 minutes
RCF	4	10 to 7194g
Brake	1	0 to 9 0 (min. brake) 9 (max. brake)
Accel	1	0 to 9
Programme	1	0-49

5.2 Run procedure

Ensure that the rotor is correctly loaded. Close the lid and press down firmly.

Press  As the drive is engaged all displays will change to ACTUAL values.

At approximately 150 rev/min the microprocessor checks a signal received from the rotor which typifies its maximum speed and checks the SET speed. Should the SET speed be greater than the maximum allowed for the rotor in use the SET speed will automatically be reduced to the maximum allowed.

When in RCF mode the speed check described above is still initiated after the SET RCF value has been converted to the equivalent speed value, if the SET RCF exceeds the maximum allowed it will be reduced to the maximum.

5.3 Examination of set values

All keys, with the exception of the stop key, change their mode of operation becoming active for only 5 seconds after being pressed.

Press function required, the associated display changes from ACTUAL to SET values for the time period and then reverts to ACTUAL.

5.4 Changing set values

Press function requiring new value. When at rest the display will change to SET, as above. Input new value, the display will then show the new data as it is entered. When the allowed number of digits are entered (see the digit display range table on the previous page), and set mode is left, the data entered is checked for validity and if valid becomes the new SET value, whilst the display reverts to ACTUAL.

5.5 Changing from time to time hold

When at rest press

and the time hold LED will come on.

Pressing toggles the hold LED in stationary mode.

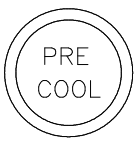
5.6 Changing between SPEED and RCF modes

When the rotor is stationary press the function key associated with the required mode. Enter new data, if the data is valid the status display will show the relevant mode (RPM or RCF), and the centrifuge will begin controlling to the new mode set value. In addition to the message on the status display a single LED will illuminate in the lower right corner of the SPEED/RCF display when in RCF mode.

5.7 Precool facility

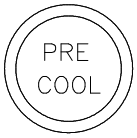
To precool a rotor and/or the rotor chamber prior to a centrifuge run proceed as follows:

1. Place required rotor on the drive spindle and tighten the spindle nut
2. Close the centrifuge lid
3. Select the required temperature as for setting run values

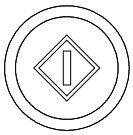
Press 

the status will show the word PRECOOL to indicate that precooling is in progress.

To terminate the precool facility:

Press 

All functions are active and can be used as under setting run values whilst precool is initiated.

If  is pressed the centrifuge will respond as for normal operation.

5.8 Programmes

A programme is defined by the values required for each of the control functions provided on the centrifuge and provision is made to store 50 different programmes numbered 0 to 49 inclusive.
All programmes (0-49) are retained when the power is off. Programmes can only be saved or recalled when the drive spindle is stationary, the lid unlocked, and the mains switch on.
It is recommended that the user maintains a log of the programmes stored and their use for each centrifuge.

5.9 Saving a programme

If a programme log is kept for the centrifuge assign the next available programme number to the programme to be saved and enter the run parameters in the log.

Press

the programme display will blank and then show a prompt cursor, enter the assigned programme number using the numeric data key. All current data is stored to that program number overwriting existing values.

5.10 Recalling a Stored Programme

To recall a previously saved programme

Press

the programme display will blank then show a prompt cursor, enter the required programme number. The programme run parameters will now be displayed.

5.11 Stop procedure

When the programme is completed the rotor will automatically come to rest and the lid lock will be released. Operation of the stop button at any time will override the programme and the rotor will come to rest.

5.12 Power failure

If the mains power to the centrifuge is interrupted during a run the rotor will coast to a stop and the lid will remain locked. The centrifuge will remain in this condition and “POWFAIL” will appear on the status display,
(see Critical System Errors).

5.13 Opening lid during power failure

An electrical interlock prevents the lid being opened while the rotor is turning or when the power is disconnected. If access to the rotor is required during power failure use of the lid lock release key is necessary, this is supplied with the accessories. Insert the key into the small hole on the top of the lid, near the front. Move the point towards the rear, a slight spring pressure will be felt and the lid lock mechanism will be actuated. Press the lid actuator to the right and open the lid. The lid is counterbalanced to remain open.

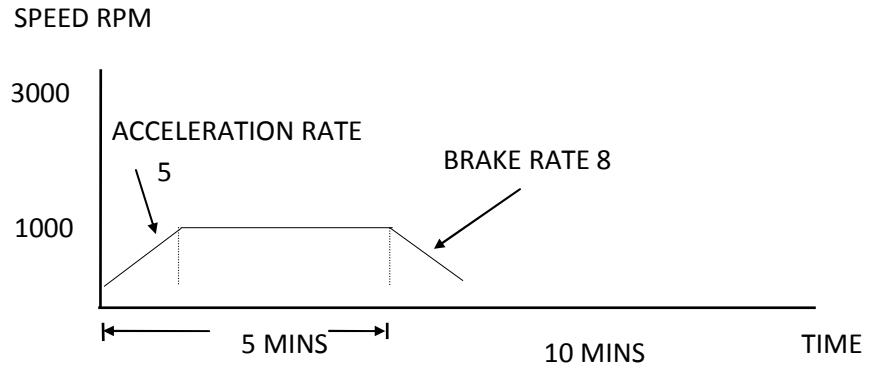
WARNING: THE ROTOR MAY STILL BE ROTATING

6. PROGRAMMING EXAMPLES

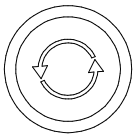
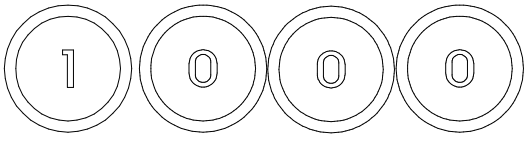
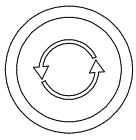
6.1 How to enter a new program

This example will show step by step how to enter a new program. The program sequence to be entered will make the rotor run up to a speed of 1000 rpm with an acceleration rate of 5. It will stay at 1000 rpm until the 5 minutes have elapsed, and then stop with a brake rate of 8.

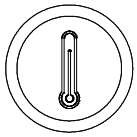
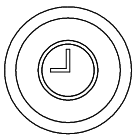
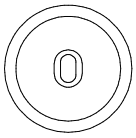
The graph illustrates the program sequence which in the example will be saved as program number 11.

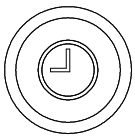


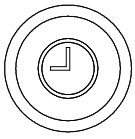
1. Select the program memory location where the program will be saved.
   - Press program recall.
   - Enter the program number 1,1 at the flashing underscore.
   - Press program recall to finish program location selection.

2. Enter the settings for the speed, temperature, time at speed and acceleration rate.
   - Press the set speed key 
   - Enter a speed of 1,0,0,0 
   - Press the set speed key 

- Enter a temperature of 4

- Press set temperature 
- Press set time 
- Enter 0 hours 

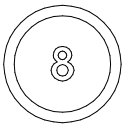
- Press set time 
- Enter 5 minutes

- Press set time 
- Press set accel

- Enter accel rate 5

- Press set acceleration

- Press set brake

- Enter 8 for the brake rate 

- Press set brake

Note: The timer starts counting down from set, or up from 00:00 in hold, when START RUN is pressed.

6.2 How to copy an existing program

This example will copy program 11, the program that was entered in the previous example, to program 22.

1. Recall program 11 to make it the currently selected program.
    - Press program recall.
    - Enter the program number 1,1 at the flashing underscore.
    - Press program recall to display required program.

2. Copy the current program to program 22.
    - Press program copy.
    - Enter the program number 2,2 at the flashing underscore.
    - Press program copy to overwrite program 22 with program 11.

7. EXPLANATION OF ERROR MESSAGES

7.1 Critical System Errors

Note 1: All critical system errors will generate an alarm bleep, and cause the lid to remain locked when the rotor is stationary. The error can only be cancelled when the machine is stationary and the lid has been opened using the manual lid lock override procedure.

Note 2: The alarm bleeper can be muted at any time using the cancel key.

ERROR MESSAGE	EXPLANATION	EFFECT ON MACHINE OPERATION	OPERATOR ACTION
BAD STOP	During brake mode the rotor has stopped prematurely before the unit has finished the run.	The unit will give an alarm.	Cancel the error and call service personnel.
BAD CHKS	The communications between the control pad and the inverter have been corrupted.	The rotor will stop.	Cancel the error and call the service personnel.
LID OPEN	The error will be generated when the lid is left open for more than four minutes and precool is in operation.	The alarm will be initiated by the refrigeration control.	Close the lid and cancel the alarm.
NO TACHO	**The rotor speed detector has malfunctioned.**	**The rotor will coast to stop.**	**Wait until the rotor has stopped then use the emergency lid open procedure (see section 5.13).**

Critical System Errors Continued

ERROR MESSAGE	EXPLANATION	EFFECT ON MACHINE OPERATION	OPERATOR ACTION
SPEED +	The rotor speed is greater than 300 rpm above where the controller thinks it should be which is potentially an over speed condition.	The rotor will stop.	Disconnect the power supply and do not use the centrifuge further until checked by service personnel.
SPEED -	The rotor has not yet reached set speed.	The rotor will stop.	Call service personnel.
REVERSE	After the rotor identification, at 250 rev/min, the rotor appeared to be rotating in the wrong direction.	The rotor will stop.	Call the service personnel.
SER TOUT	The communications between the control pod and the inverter have been corrupted.	The rotor will stop.	Call the service personnel.

Critical System Errors Continued

ERROR MESSAGE	EXPLANATION	EFFECT ON MACHINE OPERATION	OPERATOR ACTION
UNLOCKED OR LID BAR	The lid solenoid is not engaged hence the lid is not properly locked. Micro switch failure.	If the rotor is running it will coast to a stop with an alarm. If an attempt is made to restart with the lid unlocked it will give an alarm.	If the rotor was running when the error occurred wait until the rotor is stationary before using the emergency lid open procedure and call the service personnel. If the error happened when stationary, cancel the alarm and press lid firmly down, and continue. If alarm sounds again call service personnel.
PWR FAIL	The run has been interrupted by a mains supply failure.	The rotor will stop.	Cancel the error and restart the run if it is appropriate for the samples.

7.2 Uncritical System Errors

Note 1: These errors can be cancelled when the machine is stationary without the need to open the lid.

ERROR MESSAGE	EXPLANATION	EFFECT ON MACHINE OPERATION	OPERATOR ACTION
BAD ID	The rotor has not been identified before the speed has reached 250 rev/min OR Rotor has been identified as one which cannot be used in this centrifuge.	The rotor will stop	Wait until the rotor is stationary then open the lid and cancel the error Remove rotor and clean drive head. Clean and inspect rotor bore and underside of rotor. Check magnets are not missing or damaged. Check circuit function by fitting a different rotor.
SET > MAX	The set speed for the current step was greater than the maximum allowed rotor speed.	The rotor will only achieve allowed maximum speed and the run will be completed.	Change the offending set speed to less than the allowed maximum rotor speed.
TEMP LOW	The bowl temperature is less than 6°C below set temperature due to possible temperature control failure	Excessively low bowl temperature might be reached	Switch the unit off and call the service personnel

Uncritical System Errors Continued

ERROR MESSAGE	EXPLANATION	EFFECT ON MACHINE OPERATION	OPERATOR ACTION
TEMP HI	The bowl temperature is more than 6°C above set temperature due to refrigeration system failure.	Excessively high bowl temperature will occur if the rotor is running.	Switch the unit off and call the service personnel.
OVER 45°	The bowl temperature has exceeded 45°, due to refrigeration system failure.	Machine will come to a stop.	Switch the unit off and call the service personnel.
IMB HIGH	This only occurs when the machine is stationary and means the automatic imbalance test circuit has detected a fault with the imbalance detector. It can also occur if the rotor is knocked accidentally or there is a mains fluctuation.		Cancel the alarm. If the alarm persists call the service personnel.
IMB LOW	This only occurs when the rotor is stationary and means the automatic imbalance test circuit has detected a fault with the imbalance detector. It can also occur if the rotor is knocked accidentally or there is an excessive mains fluctuation.		Cancel the alarm. If the alarm persists call the service personnel.

Uncritical System Errors Continued

ERROR MESSAGE	EXPLANATION	EFFECT ON MACHINE OPERATION	OPERATOR ACTION
BAD MEM	The new data just entered has not been saved correctly in the controllers permanent memory.	Saved data may be corrupted.	Cancel the error and try again. If the error persists call the service personnel.
BAD RCF	The set RCF value is greater than the max. allowed RCF.	The motor will not start.	Enter a smaller value for the set RCF.
HOTMOTOR	The drive motor windings have overheated. The motor thermal cut-out has triggered.	The rotor will stop.	Check the air inlet and outlet for blockages, if none are found call the service personnel.

8. ROTORS

8.1 Installation of Rotor

Before fitting a rotor to the centrifuge ensure that the drive head is clean. Check that the rotor is clean and pay particular attention to the pivot pins of swing-out rotors and the pockets in angle rotors.

Locate the rotor on the drive shaft and ensuring that the correct spindle nut for the rotor in use is employed tighten nut using the spanner provided.

8.2 Removal of Rotor

Open the centrifuge lid to gain access, then set the power switch to OFF. Lift out all rotor accessories, e.g. buckets. Remove the spindle nut and grip the rotor. Gently ease the rotor upwards clear of the spindle.

Note: Do not attempt to loosen the rotor by tapping on the drive head.

8.3 Loading the Rotor

Buckets, cups and trunnions are supplied as matched, balanced assemblies. It is important that all components should be stored and used together. The rotor must always be used with a full complement of buckets, but it is not necessary for all buckets to be loaded, provided that the loads are placed symmetrically around the rotor.

When using the angle rotors ensure all the pockets are clean before fitting the buckets. When using the swing out rotor ensure that the buckets swing freely about their pivots.

If datum marks exist on the wind shielded lids, ensure that these marks are aligned with the corresponding datum on the windshield body or rotor hub.

DO NOT RUN WINDSHIELDED ROTORS WITHOUT THEIR COVERS IN PLACE. FAILURE TO COMPLY WITH THIS REQUIREMENT COULD RESULT IN SERIOUS DAMAGE TO THE CENTRIFUGE DRIVE.

CARE MUST BE TAKEN TO PREVENT DISTORTION OF WINDSHIELDED ROTORS. LIFT THEM BY GRASPING THE ARMS OF ROTOR SPIDER AND NOT BY THE WINDSHIELD.

If using a swing-out rotor, check that all cups/buckets are correctly located on their pivot pins by ensuring that they swing freely.

8.4 Balancing the rotor

The loads should be reasonably balanced, which in most cases means equalising the liquid levels by eye. In the swing out rotor do not exceed 5 grams between loads when fully or partially loaded.

When loading trunnion carriers the following procedure should be followed:
1) Weight group the buckets to within 5g.
2) Weight group the trunnion block and buckets as an assembly to within 5g.

FAILURE TO LOAD THE ROTOR CAREFULLY WILL TRIP THE OUT-OF-BALANCE SENSOR, CAUSING THE CENTRIFUGE TO STOP.

In this case the display will show “M/C has imbalanced”. An unbalanced rotor will make the centrifuge noisy in operation.

8.5 Critical Speeds

Like all centrifuges the Falcon 6/300 has a critical speed associated with each rotor. It is therefore recommended that continuous running between 400 - 700 rev/min is avoided.

8.6 Materials with specific gravity in excess of 1.2

Maximum speeds of rotors (see tables on following pages) are calculated on the basis of tubes filled with a sample of specific gravity 1.2. If liquids of higher specific gravity are used, the maximum speed of the rotor must be reduced according to formula:

$$M = \sqrt{\frac{1.2 \times N^2}{S}} \text{ RPM}$$

Where M = New maximum speed
N = Maximum rotor speed at 1.2 specific gravity
S = Specific gravity of sample

8.7 Spillages

In the event of a liquid spillage the affected surfaces should be cleaned immediately. The rotor and accessories should be removed for thorough cleaning. Regular cleaning of the centrifuge is highly recommended to avoid the build up of contaminants.

8.8 Corrosive materials

Where particularly corrosive materials are to be centrifuged, the samples should be placed in sealed containers and all necessary precautions observed. The following list gives examples of corrosive materials used in laboratories.

- Phenol/cresol/water
- Chloroform/isoamyl alcohol
- Salt solutions (especially ammonium sulphate)
- Solutions of ammonium hydroxide and acidic solutions e.g. hydrochloric, trichoracetic and perchloric acids.

Other materials may be equally corrosive, the user is responsible for checking the characteristics of substances used.

NOTE: The following materials are prohibited:
Flammable or explosive materials
Materials which chemically interact vigorously

8.9 Infective samples

Very special care is necessary when infective materials are to be centrifuged. Sealed containers should always be used. The caps should be double checked to ensure that they are not damaged and fit correctly prior to starting the centrifuge. After use containers and caps should be sterilised immediately using a non-corrosive method.

NOTE: Sealed containers and related components are intended to be part of biosafety systems such as are specified in international and national biosafety guide lines, and cannot be relied on as the only means of safeguarding workers and the environment when handling pathogenic micro-organisms.

8.10 Servicing

It is advisable to have this centrifuge serviced regularly by a competent engineer, preferably the manufacturer's representative, at least once per year.

9. ROTOR AND ACCESSORY TABLES

The following pages contain tables listing the rotors and accessories which are available for use with your Falcon 6/300 centrifuge.

The centrifuge complies with the requirements of CAN/CSA C22.2 No. 1010.2.020-94 only when fitted with one of the rotors show in these tables.

Mixed loads may be carried, providing that the two opposite buckets are carrying the same type of load.

9.1 Table 1 Swing-out rotors

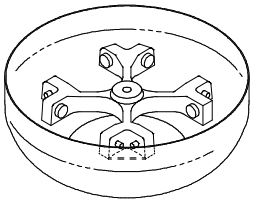
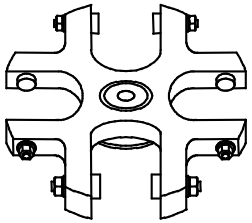
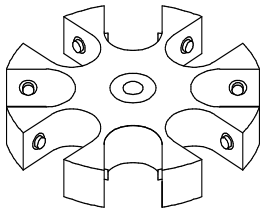
ROTOR	CUP Packed sets of 4	ADAPTOR Packed sets of 4	ROTOR CAPACITY	MAX. SPEED REFRIGERATED	MAX. SPEED AIR COOLED	PERMISSIBLE MAX RCF x g (Refrigerated)	TUBE SIZES	
							Dia (mm)	Ht (mm) inc.cap
4-place wind shielded High speed swing-out 43124-756 	Bucket assy 750 ml 43551.123	43155-1354 (red)	20 x 50 ml	4700	3660	4879	32.0	120
		43155-134 A(green)	76 x 15 ml	4700	3660	4779	17	125
		43155-133 5(orange)	112 x 7 ml	4700	3660	4655	13	125
		43155-1322 (blue)	148 x 5 ml	4700	3660	4655	12	125
		43155-136 9(yellow)	28 x 30 ml	4700	3660	4655	28.5	125
		43155-152(beige)	25x50 ml	4700	3660	4879	32	125
		43155-153(maroon)	48x15 ml	4700	3600	4779	17	125
	Bottle with cap 750 ml 43551-124	43551-124A(white)	4 x 750 ml	4700	3660	4964		
	Blood bag liners 43551-126	43551-1269(white)	4x98 mm	4700	3660	4964		

Table 1 Swing-out rotors continued

ROTOR	CUP	ADAPTOR	ROTOR CAPACITY	MAX. SPEED	PERMISSIBLE MAX RCF x g	TUBE SIZES	
	Packed sets of 4	Packed sets of 4				Dia (mm)	Ht (mm) inc.cap
4-place swing-out 43124-1298 	Slotted cup for tissue culture bottle 43551-130		4x250 ml	2500	1450		
	Micro-titre carrier 41159-1900		4 x carrier (max. 3 trays per carrier)	2500	1329*	*Subject to capability of trays used	
8-place swing-out 43122.105 	Sealed cup 200 ml 43551-121	34159-3021(brown) 34159-301 7(yellow) 34159-304 0(green) 34159-303 6(grey) 34159-305 5(orange) 34159-306 A(blue) 34159-308(black) 34159-309(beige) 34159-310(maroon)	8 x 100 ml 8 x 50 ml (DHSS bottle) 56 x 15 ml 32 x 10 ml (DHSS) 72 x 7 l 96 x 5 ml 56x15 ml 8x50 ml 24x15 ml	3200 3200 3200 3200 3200 3200 3200 3200 3200	2375 2375 2375 2335 2357 2375 2315 2375 2375	39.5 29 17 16.5 13 12 17 29 17	118 118 118 100 118 118 118 120 120
	Bottle with cap 200 ml 43551-103 (each)		8 x 200 ml	3200	2370	57.7	120

9.2 Table 2 Angle rotors

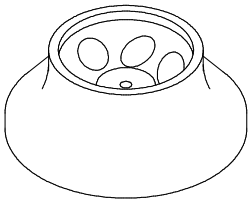
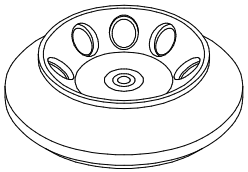
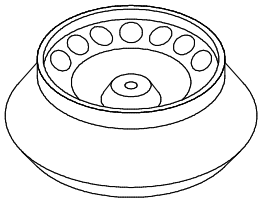
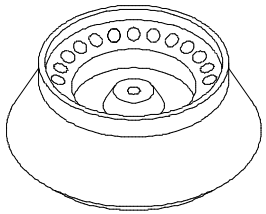
ROTOR	CUP Packed sets of 4	ADAPTOR Packed sets of 4	ROTOR CAPACITY	MAX. SPEED	MAX. RCF x g	TUBE SIZES Dia (mm)	 Ht (mm) inc.cap
6 place universal angle 43117-605 	34411-912 34411-912 34411-912 34411-912	34142-105 34144-308 34151-302 34153-302	6 x 100 ml 6 x 50 ml 12 x 15 ml 30 x 7 ml	6000 6000 6000 6000	5524 5108 5524 5311	42 29 17 13	125 120 118 118
8 x 50ml angle rotor 43117-610 	Sealed Aluminium bucket 43156-603	34142-110 50ml conical tube adaptor	8 x 50 ml	6000	5635	29	120
16 place universal angle 43114-609 		34144-307	16 x 50 ml 16 x 15 ml	6000 6000	5920 5720	29 17.5	110 110

Table 2 Angle rotors continued

ROTOR	CUP	ADAPTOR	ROTOR	MAX. SPEED	MAX. RCF x g	TUBE SIZES	
	Packed sets of 4	Packed sets of 4	CAPACITY			Dia (mm)	Ht (mm) inc.cap
24 place universal angle 43114-608 			24 x 15 ml	6000	6030	17	108

10. MAINTENANCE

This section describes the basic maintenance procedures, in particular, the methods and materials used for cleaning the centrifuge, rotors and accessories.

It is recommended that a regular inspection of the centrifuge is made after 1000 hours of operation or at least once per year, whichever is the sooner. This should include all rotors and accessories.

Electricity at Work Regulations (1989). Portable Appliance Testing (PAT) - Where applicable this centrifuge should be inspected and tested regularly in accordance with these regulations and the appropriate records kept.

For Warranty Service and Maintenance please see the details given at the front of this manual.

10.1 Resetting the Thermal Fuse

The Falcon unit is fitted with a thermal fuse/trip to prevent power overload. The trip is located at the rear of the unit adjacent to the mains cable and can be reset by pressing the plunger back in, towards the rear panel. Should the fuse trip immediately or again during normal use, the power supply should be disconnected and the service engineer called.

10.2 Cleaning

To maintain a good appearance and to prevent dirt build-up, the casing and the inside of the bowl should be cleaned regularly using a soft cloth dampened with a neutral detergent and warm water. The keypad and display may also be cleaned in this manner, but should be wiped dry immediately.

If corrosive materials are used in the centrifuge, it is especially important to clean out the centrifuge bowl thoroughly. If a major spillage occurs in the bowl, the excess liquid should be mopped out and the bowl then cleaned using a suitable cleaning agent.

10.3 Disinfecting

To disinfect the centrifuge the following cleaning fluids may be used

TERMINEX 2 (available from Arrow Chemicals Ltd)
VIRKON (available from Antec International)

These cleaning agents if used as instructed by the manufacturer should not be harmful to the centrifuge or the accessories supplied for use with it.

WARNING
SOLVENTS OR GRITTY CLEANERS SHOULD NEVER BE USED
EXCESSIVE USE OF WATER SHOULD BE AVOIDED

10.4 Drive shaft

The drive shaft should be cleaned periodically with a solvent to remove excessive grease. When clean, re-lubricate the shaft lightly with petroleum jelly.

10.5 Rotors and buckets.

The typical environment used in centrifuging, can, over a period of time create a strength degrading effect in rotors and accessories used, also additional hazards in the form of corrosion and/or stress corrosion. These conditions can reduce the basic strength of the centrifuge component and could lead to premature failure.

Simple corrosion, particularly in Aluminium, can usually be seen by the naked eye and appears in the form of pitting or white fluffy deposits on the material surface. Stress corrosion usually is more damaging than simple corrosion and is the adverse effect created by a combination of both stress and chemical reaction.

The rotors and accessories should be handled with care to avoid damage. Prior to storage, all components should be protected against corrosion using MSE Rotor Spray (Cat No. 17341-1512) which is an anti-corrosion and de-waterizing agent.

Washing the rotors and accessories in warm water containing mild detergent, ensuring it`s thoroughly dry, followed by spraying with MSE Rotor Protection Spray (Cat No 17341-1512) will help to prolong the life of your rotor and accessories. Always handle rotors and accessories with care to avoid damage. Buckets and cups should be stored inverted.

Rotors

The trunnions of the swing-out rotors must be lubricated at regular intervals to avoid the occurrence of imbalance within the assembly. Non maintenance of the trunnions can lead to the buckets swinging out in a staggered motion inducing imbalance and possible damage to samples or the centrifuge.

IT IS RECCOMENDED THAT THE TRUNNIONS ARE LUBRICATED DAILY OR EVERY 8 HOURS OF OPERATIONAL USE.

Before lubricating the trunnions ensure that all of the existing Molykote and any debris is fully removed - do not use abrasive cleaners or this operation.

Buckets

Ensure that the slots machined into the buckets are clean and lightly lubricated.

- Pivot areas should be cleaned using Loctite 7063 and a soft cloth (cheesecloth).
- Spray each area with lubricant spray D321R
- Leave for approximately 20 to 30 minutes to dry and then polish each pivot area with a clean soft cloth

Spray cleaner – Loctite 7063 (Cat. No. SG. 16200.026)
Spray lubricant – Molykote D321R (Cat. No. SG. 22100.042)

NOTE: Please follow spray cleaner/lubricant manufacturers recommendations during use.

10.6 O-Rings

Ensure that the O-Rings fitted to the sealing caps and covers are lightly coated with silicone grease. Check the O-Rings regularly for cuts and abrasions, replacing as necessary but at least once a year.

10.7 Sterilisation

All of the rotors, buckets and sealing caps (with O-Rings removed) may be sterilised by autoclaving at 121℃ for 22 minutes. The plastic adaptors may be autoclaved at 121℃ for 10 minutes.

DO NOT autoclave any parts where the protective finish is scratched or damaged.

If the means available for disinfection of certain microbiological agents are inadequate, the safety officer should be consulted and appropriate steps taken.

10.8 Lid/Bowl seal.

Lightly coat the lid seal with French chalk occasionally and in particular after cleaning.

11. SERVICE INSTRUCTIONS

MSE (UK) Ltd is committed to giving our customers the best possible service. If your centrifuge should require service at any time please follow these procedures:

All countries except UK- Contact your local MSE (UK) Ltd distributor, details can be found on our website: www.mseuk.co.uk

UK only For all technical and service enquires contact:
MSE (UK) Ltd
Worsley Bridge Road
Lower Sydenham
London, SE26 5AZ
Telephone +44 (0) 870 609 4097
Fax +44 (0) 208 650 8408
E-mail: sales@mseuk.co.uk

1. Contact the repairs centre - have the model, serial number, and date of purchase and fault description available.
2. You will be given a return goods authorisation number and directions for shipping.
3. Remove all rotors, buckets and adapters. Do not ship these items - only the centrifuge.
4. Thoroughly clean and disinfect the centrifuge.
5. Fill out the attached service request form and place inside the centrifuge.
6. Pack in a protective box (preferably that in which the centrifuge was originally supplied).
7. MSE (UK) Ltd will specify the carrier to be used and will give details of how the freight is to be charged.

Falcon 6/300 SERVICE REQUEST FORM

Should it become necessary to have your MSE centrifuge repaired. Please take a few moments to fill out this form which will help us to ensure you receive the best and fastest service possible.

Serial number :- .....
(on plate at back of unit)

Date purchased :- .....

Where purchased :- .....

Brief description of fault :- .....

.....

.....

Date fault first occurred :- .....

Date repair centre contacted :- .....

Authorisation number :- .....

Condition of centrifuge :- .....

Has it been disinfected? Yes / No

Disinfectant used :- .....

Contact name :- .....

Address :- .....

.....

.....

Telephone Number :- .....

Signature :- .....

MSE (UK) Ltd

Part Number		Description	UOM	Quantity
66500.993		**LID LOCK ASSY M3000**		
60800.001		TERMINATED SOLENOID	each	1
16010.009		MOLYKOTE PG30L PLASTICSLIP	each	0.001
86120.050		SOLENOID PLUNGER	each	1
86210.016		CLAMP PLATE	each	1
88120.162		CATCH PIN SHORT	each	1
36020.027		MICROSWITCH	each	1
37010.045		TERMINAL BLOCK	each	0.17
72100.116		SOLENOID NOSE PIN	each	1
72100.118		ACTUATING DISC	each	1
72100.119		CATCH BASEPLATE	each	1
72900.047		CONICAL SPRING	each	1
72900.048		CATCH SPRING	each	1
78100.053		SPRING	each	1
11060.410		SCREW M4 X 10 LG PAN HD	each	2
11060.512		SCREW M5X12 LG PAN HD	each	1
11070.220		M2X20 CH. HD. SCR ST. ST.	each	2
11860.001		PLASTITE SCREW NO 6X3/8	each	2
13170.200		M2 PLAIN STST WASHER	each	2
13260.400		WASHER M4 S/P	each	2
13260.500		WASHER M5 S/P	each	1
13360.200		WASHER M2 S/COIL STEEL	each	2
14030.009		PUSH ON FIXER	each	1
14100.018		SPACER SIZE M5	each	1
23400.014		LOCTITE SCREW LOC 222E	each	0.001
72900.059		LOCK BAR	each	2
87120.073		LOCK PIN	each	2
14030.004		PUSH-ON FIX	each	4
16010.010		GREASE SHELL ALBIDA RL2	each	0.01

MSE (UK) Ltd

Part number		Description	UOM	Quantity
61080.054		**TACHO PCB ASSY**		1
61400.030		TACHO LEAD ASSY	each	1
43040.071		HALL EFFECT SENSOR	each	1
44010.084		TACHO PCB	each	1

MSE (UK) Ltd

Part number	Description	Quantity
66500.1176DA	**FALCON 220/240V REF**	

15800.002		EARTH WASHER M5		1
71100.919		RATING LABEL		1
15400.003		CABLE TIE		20
13360.200		WASHER M2 S/COIL STEEL		2
13260.800		WASHER M8 S/PROOF		10
11660.616		SCREW M6 X 16		8
12260.800		NUT M8 FULL STEEL		6
23020.009		R404A REFRIGERANT GAS		0.29
23400.012		LOCTITE 601 (50 ML SIZE)		0.001
16200.001		LOCTITE STUDLOCK 270		0.001
71100.1022		BLANK LABEL - METALIZED		2
11860.013		TAPTITE M4 X 8 PAN HEAD		6
61200.412		LOW VOLTAGE CABLEFROM MM3000I		1
61500.079		IMBALANCE CABLE M3000		1
61500.080		TACHO CABLE ASSY M3000		1
61500.081		ROTOR I/D1 CABLE ASSY M3000		1
61500.082		ROTOR I/D2 CABLE ASSY M3000		1
61500.083		MAIN SWITCH TO TB CABLEFORM		1
61500.137		MAINS SWITCH LEAD ASSY. FALCON		1
15520.039		.110 X .032 RED HI TAG		2
15520.010		.110 X .02 RED F I		4
15400.005		CABLE CLAMP		3
46020.021		THERMISTOR LEAD WIRE ASSY		1
96500.719		THERMISTOR COVER PLATE-M2000R		1
71500.122		THERMISTOR COVER PLATE GASKET		1
96500.876		PCB SCREEN PLATE. M3000		1
75050.010		GROMMET STRIP		0.52
15500.257		FASTON TAB		1
96501.057		FAN COWLING STAY FALCON		1
81170.060		PULLEY FALCON 6/300		1
23400.014		LOCTITE SCREW LOC 222E		0.001
11660.625		SCREW M6X25 SKT HD		4
15400.006		CABLE TIE BASE		2
16200.019		LOCTITE 406 20G		0.001
16200.024		LOCTITE 770 PRIMER		0.001
32400.028		MAINS FILTER 11A 250V F4018		1
61500.138		EARTH LEAD ASSY. FALCON R 240V		1
66500.1234		4 X 750 ROTOR 4700RPM		1

MSE (UK) Ltd

Part number	Description	Quantity
66500.1176DA	**FALCON 220/240V REF**	

27200.003		BUBBLE WRAP C.120 SMALL		0.2
77800.019		ENAMEL YELLOW, UMBROL NO 188		0.001
73300.026		D.U. BUSH 10 ID		1
73300.027		D.U. BUSH 6 ID		1
73700.106		CIRCLIP		2
73900.005		CLEVIS		1
74030.002		DRIVE BELT JB 5M1030		1
74600.041		RUBBER BUFFER/FOOT		6
77300.184		FLARE NUT 3/8 SHORT		1
77300.185		BEND 90 EQUAL LONG ENDS		1
78100.113		TENSION SPRING		2
78100.031		TENSION SPRING		1
78100.050		COMPRESSION SPRING		1
78100.051		SPRING PIN		1
78100.052		DISC SPRING		2
71100.1046		DANYO LOGO		1
11060.310		SCREW M3X10 LG PAN ND.		4
11060.410		SCREW M4 X 10 LG PAN HD.		25
11060.416		SCREW M4 X 16 LG PAN HD.		7
11060.420		SCREW M4 X 20 LG PAN HD		2
11170.312		SCREW M3 X 12L CSK HD POZI S/S		1
11160.413		SCREW M4X16L RAISED CSK S`DRIV		5
11060.615		SCREW M6 X 16 PAN HD POZI		3
11460.612		SCREW M6 X 12 LG HEX HD		1
11460.825		BOLT M8 X 25L		4
11560.508		SKT. SET SCREW M5 X 9		2
11560.813		SCREW M8 X 25L		4
12220.501		BRASS NUT M5		3
12260.400		NUT M4 HEX		9
12260.600		NUT M6 HEX		6

MSE (UK) Ltd

Part number	Description	Quantity
66500.1176DA	**FALCON 220/240V REF**	

12360.900		NUT NYLOC M10		1
12760.404		1M4 NUT RETAINER		25
12760.605		CAPTIVE NUT SPIRE M6		12
13160.300		WASHER M3		3
13160.400		WASHER M4 PLAIN		31
13160.600		WASHER M6 PLAIN		8
13160.800		WASHER M8 M.S.		7
13260.400		WASHER M4 S/P		42
13260.500		WASHER M5 S/P		5
13260.600		WASHER M6 INT. S/P		20
14010.328		DOWEL PIN 3MM X 16 LG		1
14030.008		PUSH ON FIXER		2
13170.200		M2 PLAIN STST WASHER		2
14900.189		WASHER 8BA S/P		2
14900.281		SCREW 8BA X 1/2” CH. HD		2
14900.360		WASHER RETAINING		6
15400.004		CABLE TIE		4
15400.017		TIE HOLDER		2
15700.212		RING TAG M5		1
66500.1100		PCB MOUNTING ASSY M3000I		1
61100.079		MAINS CABLE ASSY M3000		1
11170.410		SCR. CSK M4 X 10 SS		4
61200.372		TRANSFORMER ASSY/CABLEFORM		1
66500.1188DA		FALCON FRONT PANEL ASSY REF		1
66500.1181		FALCON MOTOR ASSY 240V		1
66500.1098AD		LID TRAY ASSY M3000I 240		1
66500.1141		M3000 DIGITAL ADJ B/H` SG ASSY		1
96500.063		LEVER ASSY RH		1
96500.064		LEVER ASSY LH		1
96500.964AD		SIDE COVER RH ASSY PAINTED		1
96500.965AD		SIDE COVER LH PAINTED		1
96500.083AD		LID COVER		1
96500.094		SPRING POST		1
96500.096AD		LIFTING HANDEL ASSY		2
66500.1199		REFRIGERATION SUB ASSY-FALCON		1
66500.1197		ELECTRICAL SUB ASSY-FALCON		1

MSE (UK) Ltd

Part number	Description	Quantity
66500.1176DA	**FALCON 220/240V REF**	

11560.606		SKT. SET SCREW M6 X 6 CONE POINTSLIDE BRACKET		1
96500.733		SLIDE BRACKET		1
96501.080		MAINS SWITCH GUARD - FALCON		1
96500.861AJ		EVAPORATOR & BASE ASSY		1
96500.985AD		FALCON TOP COVER ASSY PAINTED		1
81140.072		BUFFER/FOOT SPACER		6
86000.005		THREADED ROD		1
86110.136		ROD		1
86210.015		MICROSWITCH NUT		1
86230.020		PIVOT		1
88000.015		LATCH MOULDING		1
88110.060		THREADED SPACER M4X28.5		4
88130.027		WASHER		2
88820.026		ROD SLEEVE		1
31100.017		`P` CLIP		1
31100.014		`P` CLIP		3
31100.025		WIRE SUPPORTS		2
31200.036		CABLE ENTRY CLAMP		1
31200.041		SKINTOP LOCKNUT		1
32600.095		FUSE 12A (TIME LAG) 6.3X32 MM		2
32900.036		FUSEHOLDER 20A 250V		2
33040.317		RING GROMMET		2
36020.051		MICROSWITCH 10A		1
36040.067		MAINS SWITCH 240V-GREEN		1
71100.143		FUSE LABEL - 12A 6.32X32MM		1
71100.864FB		DIRECTION LABEL-C`FUGES		1
71500.039		GAITER		1
71800.031		SLIDE PLATE MOULDING		1
71800.048		LATCH SPACER		1
72100.428		DOOR SEAL		1.5

Section 2

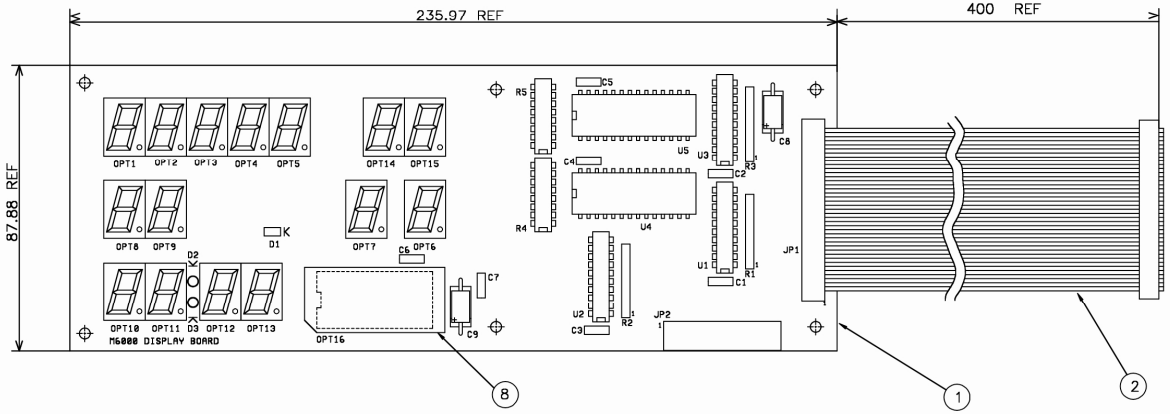
Assembly Drawings

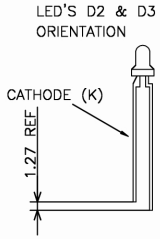
Drawing Number: 61080-325

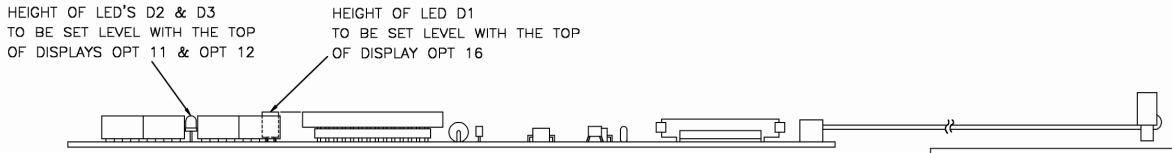
RMK	PART CODE	QT	NAME	CIRCUIT REF.
1	44010-244	1	M6000 DISPLAY PCB	
2	61200-328	1	RIBBON CABLE ASSY	JP1
3	41020-325	7	CAP.CER. 100nF/50V	C1,C2,C3,C4 C5,C6,C7.
4	41010-616	2	CAP.ELECT. 100µF/10V	C8,C9
5	42050-062	1	LED HLMPS500	D1
6	42050-060	2	LED VL934SGD-5V	D2,D3.
7	35020-258	1	CONNECTOR DU PONT RELIFLEX 68147.010	JP2
8	43050-017	1	IC SOCKET 28 PIN	SKT1
9	42050-050	15	LED DISPLAY HDSP5601	OPT1,OPT2,OPT3,OPT4, OPT5,OPT6,OPT7,OPT8, OPT9,OPT10,OPT11,OPT12 OPT13,OPT14,OP15.
10	42050-061	1	ALPHA NUMERIC DISPLAY HDSP2113	OPT16
11	45500-018	3	RESISTOR SIP 8 x 10K	R1,R2,R3
12	45500-023	2	RESISTOR DIP 8 x 10R	R4,R5
13	43040-234	3	IC 74HC573	U1,U2,U3
14	43040-231	2	IC ICM7218AIJI	U4,U5
15	15900.001	2	NO. 1 FISHSPINE BEAD	D2,D3

NOTES :

1. ENSURE THAT LED'S ITEMS 5 AND 6 ARE LOCATED VERTICALLY AND WITH THERE HEIGHTS ARE SET AS STATED.
2. FOR CIRCUIT DIAGRAM SEE SHEET 2 OF THIS DRAWING.
3. TEST ASSEMBLED BOARD IN ACCORDANCE WITH TEST SPECIFICATION NUMBER QTS97/05
4. AFTER ASSEMBLY THE PCB IS TO BE STORED IN AN ANTI-STATIC BAG UNTIL REQUIRED.
5. FIT FISHSPINE BEAD ON CATHODE LEG OF LEDS (ITEM 6) TO ENSURE TOP OF LEDS ARE LEVEL WITH TOP OF THE 7 SEGMENT DISPLAYS.






HEIGHT OF LED'S D2 & D3
TO BE SET LEVEL WITH THE TOP
OF DISPLAYS OPT 11 & OPT 12
HEIGHT OF LED D1
TO BE SET LEVEL WITH THE TOP
OF DISPLAY OPT 16

THIRD ANGLE

FILE

APPROVED

CHECKED

DRAWN SD 5/2/97

THIS BOARD CONTAINS STATIC SENSITIVE DEVICES
AND SHOULD BE HANDLED IN AN APPROPRIATE MANNER

This drawing embodies confidential information and is the property of SANYO Gallenkamp PLC. ©

No.	REVISIONS	CHECKED	APPROVED	DATE

MATERIAL: SEE PARTS LIST
FINISH: SEE NOTES

FIRST USED ON
FALCON 6/300 REFRIGERATED
FIRST INTRODUCED ON SPEC NO. 96-010

TITLE
MAIN DISPLAY PCB ASSY.

TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 0.3

DIMENSIONS IN mm

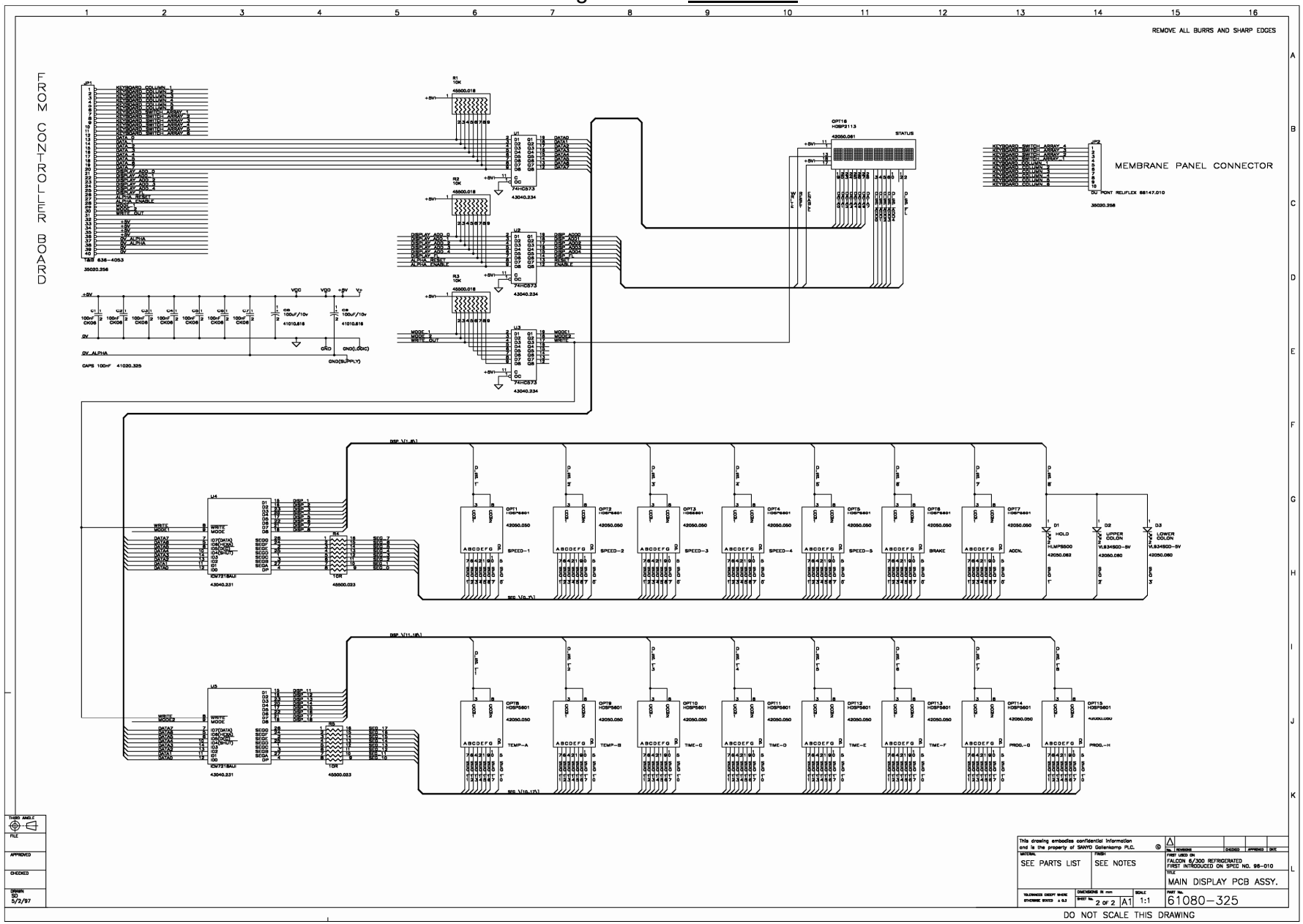
SHEET No. 1 OF 2 A2

SCALE 1:1

PART No. 61080-325

DO NOT SCALE THIS DRAWING

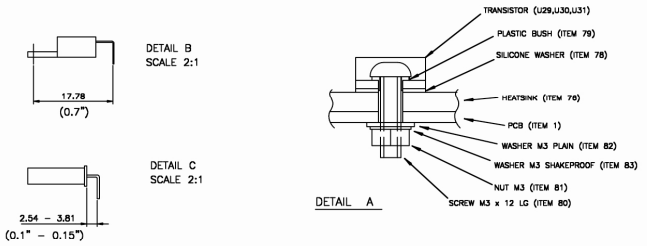
Drawing Number: 61080-325

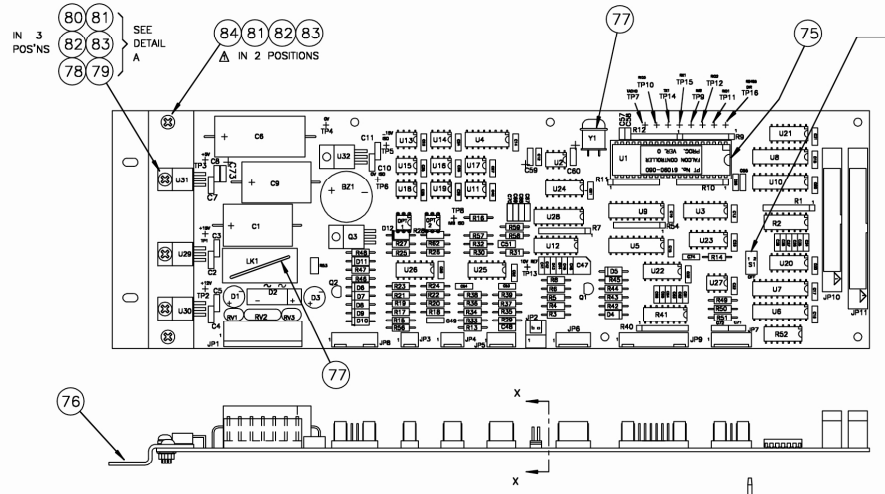


Drawing Number: 61080-328

No	PART CODE	QTY	NAME	DET. REF.	COMPONENT LEG PITCH
1	44010-250	1	M6000 CONTROL PCB		–
2	31080-003	1	12V PIEZO BUZZER	BZ1	–
3	41010-730	2	CAP. 2200µF/40V ELECT.	C1,C9	38.1 (1.50")
4	41020-325	2	CAP. 100nF/50V	C2,C10	–
5	41020-310	58	CAP. 100nF	C3,C4,C5,C7,C8, C11 TO C46 INC. C48 TO CC54 INC. C56 C61 TO C70 INC.	–
6	41010.810	1	CAP. 4700µF/25V ELECT.	C6	48.3 (1.90")
7	41060-600	1	CAP. 10nF POLYSTYRENE	C47	–
8	41020-248	1	CAP. 4n7F	C48	–
9	41050-548	1	CAP. 47µF/6V TANT.	C55	–
10	41050-510	3	CAP. 10µF/16V	C59,C73 ,C60	–
11	41020-933	2	CAP. 33pF	C57,C58	–
12	41020-308	2	CAP. 10nF/25V	C71,C72	–
13	42030-019	2	BRIDGE RECT. W005	D1,D3	–
14	42030-012	1	BRIDGE RECT. KBU4D	D2	–
15	42040-013	5	DIODE IN4148	D4,D5,D6,D8 ,D12	12.7 (0.50")
16	42020-028	1	DIODE 5V1 ZENNER	D7	12.7 (0.50")
17	42020-045	2	DIODE 6V8 ZENNER	D9,D10	12.7 (0.50")
18	42030-010	1	DIODE IN4001	D11	12.7 (0.50")
19	35020-240	1	CONNECTOR 7-WAY MOLEX 10-32-1071	JP1	–
20	35020-271	1	CONNECTOR 2-WAY JST B2P5PHF1AA	JP2	–
21	31400-201	1	CONNECTOR 3-WAY MOLEX 22-27-2031	JP3	–
22	31400-200	1	CONNECTOR 4-WAY MOLEX 22-27-2041	JP4	–
23	31400-202	1	CONNECTOR 5-WAY MOLEX 22-27-2051	JP5	–
24	31400-184	1	CONNECTOR 6-WAY MOLEX 22-27-2061	JP6	–
25	31400-067	1	CONNECTOR 7-WAY MOLEX 22-27-2071	JP7	–
26	31400-068	1	CONNECTOR 8-WAY MOLEX 22-27-2081	JP8	–
27	31400-248	1	CONNECTOR 12-WAY MOLEX 22-27-2121	JP9	–
28	35020-284	1	34 WAY HEADER MOLEX 38-26-7345	JP10	–
29	35020-285	1	40 WAY HEADER MOLEX 38-26-7405	JP11	–
30	43040-027	2	OPTO COUPLER TIL 116	OPT1,OPT2	–
31	46060-086	2	TRANSISTOR BC557	Q1,Q2	–
32	46060-087	1	TRANSISTOR RFP4N05L	Q3	SEE DETAIL B
33	45700.005	2	VARISTOR V33ZA1	RV1,RV3	–
34	45700.006	1	VARISTOR V18ZA1	RV2	–
35	45500-016	2	RESISTOR PACK 100K 8PK SIP	R1,R40	–
36	45500-017	2	RESISTOR PACK 10K 8PK DIP	R2,R41	–
37	45420-715	3	RESISTOR 15K 1%	R3,R42,R45	12.7 (0.50")
38	45420-710	12	RESISTOR 10K 1%	R4,R5,R6 R13, ,R17 R22,R25,R28 R48,R47 ,R57,R58	12.7 (0.50")
39	45500-018	6	RESISTOR PACK 10K 8PK SIP	R7,R8,R10 R11,R12,R54	–
40	45420-816	1	RESISTOR 160K 1%	R8	12.7 (0.50")
41	45420-810	5	RESISTOR 100K 1%	R20,R24 R44,R48 ,R59	12.7 (0.50")
42	45420-522	1	RESISTOR 220R 1%	R16	12.7 (0.50")
43	45420-724	1	RESISTOR 24K 1%	R18,	12.7 (0.50")
44	45420-647	8	RESISTOR 4K7 1%	R14, R19,R23, R32, R38,R39 ,R56,R62	12.7 (0.50")
45	45420-722	1	RESISTOR 22K 1%	R28	12.7 (0.50")
46	45420-622	2	RESISTOR 2K2 1%	R29,R33	12.7 (0.50")
47	45420-712	3	RESISTOR 12K 1%	R30,R35,R36	12.7 (0.50")
48	45420-720	3	RESISTOR 20K 1%	R31,R34,R37	12.7 (0.50")
49	45420-747	1	RESISTOR 47K 1%	R43	12.7 (0.50")
50	45420-610	2	RESISTOR 1K0 1%	R49,R51	12.7 (0.50")
51	45420-510	1	RESISTOR 100R 1%	R50	12.7 (0.50")
52	45500-021	1	RESISTOR PACK 150R 7PK DIP	R52	–
53	36070-013	1	SWITCH ERG SDS2014	S1	–
54	46030-007	16	TEST POINT	TP1 TO TP16 INCL.	–

No	PART CODE	QTY	NAME	DET. REF.	COMPONENT LEG PITCH
55	61090-060	1	PROGRAMMED P87C51FC FALCON	U1	–
56	43040-229	1	I.C. TL7705A	U2	–
57	43040-238	2	I.C. 74HC238	U3,U4	–
58	43040-234	5	I.C. 74HC573	U5,U6,U7 U8,U9	–
59	43040-237	1	I.C. 74HC245	U10	–
60	43040-240	1	I.C. REFD1	U11	–
61	43040-241	1	I.C. MC14443P	U12	–
62	43500.027	7	I.C. NM93C66N	U13,U14,U15,U16 U17,U18,U19	–
63	43040-227	5	I.C. 74HC14	U20,U21,U22 U23,U24	–
64	43040-112	2	I.C. LM339	U25,U26	–
65	43040-239	1	I.C. SN75176	U27	–
66	43040-142	1	I.C. ULN2803A	U28	–
67	47040-015	2	I.C. LM340T15 VOLT. REG.	U29,U32	SEE DETAIL B
68	43040-228	1	I.C. LM7812 VOLT. REG.	U30	SEE DETAIL B
69	43040-093	1	I.C. LM7805 VOLT. REG.	U31	SEE DETAIL B
70	41600-009	1	CRYSTAL 12MHz	Y1	SEE DETAIL C
71	45420-633	2	RESISTOR 3K3	R15 ,R27	12.7 (0.50")
72	45420-733	1	RESISTOR 33K	R21	12.7 (0.50")
73					
74					
75	43050-015	1	40 PIN I.C. SOCKET		–
76	96500-926	1	HEATSINK CONTROL PCB		–
77	29080-004	70 mm	TINNED COPPER WIRE	LK1,Y1	LK1: 26.9 (1.06") Y1: 11.2 (0.44")
78	46070-025	3	WASHER SILICONE	FOR U29,U30,U31	–
79	46070-026	3	PLASTIC BUSH	FOR U29,U30,U31	–
80	11060-310 ⚠	3	SCREW M3 x 10 LG.	FOR U29,U30,U31	–
81	12260-300	5	NUT M3	FOR U29,U30,U31 & H/SK	–
82	13160-300	5	WASHER M3 PLAIN		–
83	13260-300	5	WASHER M3 SHAKEPROOF		–
84	11060-308 ⚠	2	SCREW M3 x 8 LG.	H/SK	–





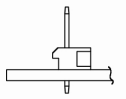
	SW1	SW2
CUSTOMER MODE	OFF	ON
PRODUCTION TESTS	ON	ON

DIL SWITCH POSITIONS (FALCON)

NOTES :–

1. FOR CIRCUIT DIAGRAM SEE SHEETS 2 AND 3 OF THIS DRAWING
2. TEST ASSEMBLED BOARD IN ACCORDANCE WITH TEST SPECIFICATION CTS/97/04.
3. AFTER ASSEMBLY THE PCB IS TO BE STORED IN AN ANTI-STATIC BAG UNTIL REQUIRED.
4. WHEN BENDING THE RESISTOR/DIODE LEGS ENSURE THAT THE BODY IS CENTRAL.

THIS BOARD CONTAINS STATIC SENSITIVE DEVICES
APPROPRIATE HANDLING PROCEDURES SHOULD BE OBSERVED



THIRD ANGLE

FILE

APPROVED ZI 19.3.97

CHECKED MSD 19.3.97

DRAWN SD 19.3.97

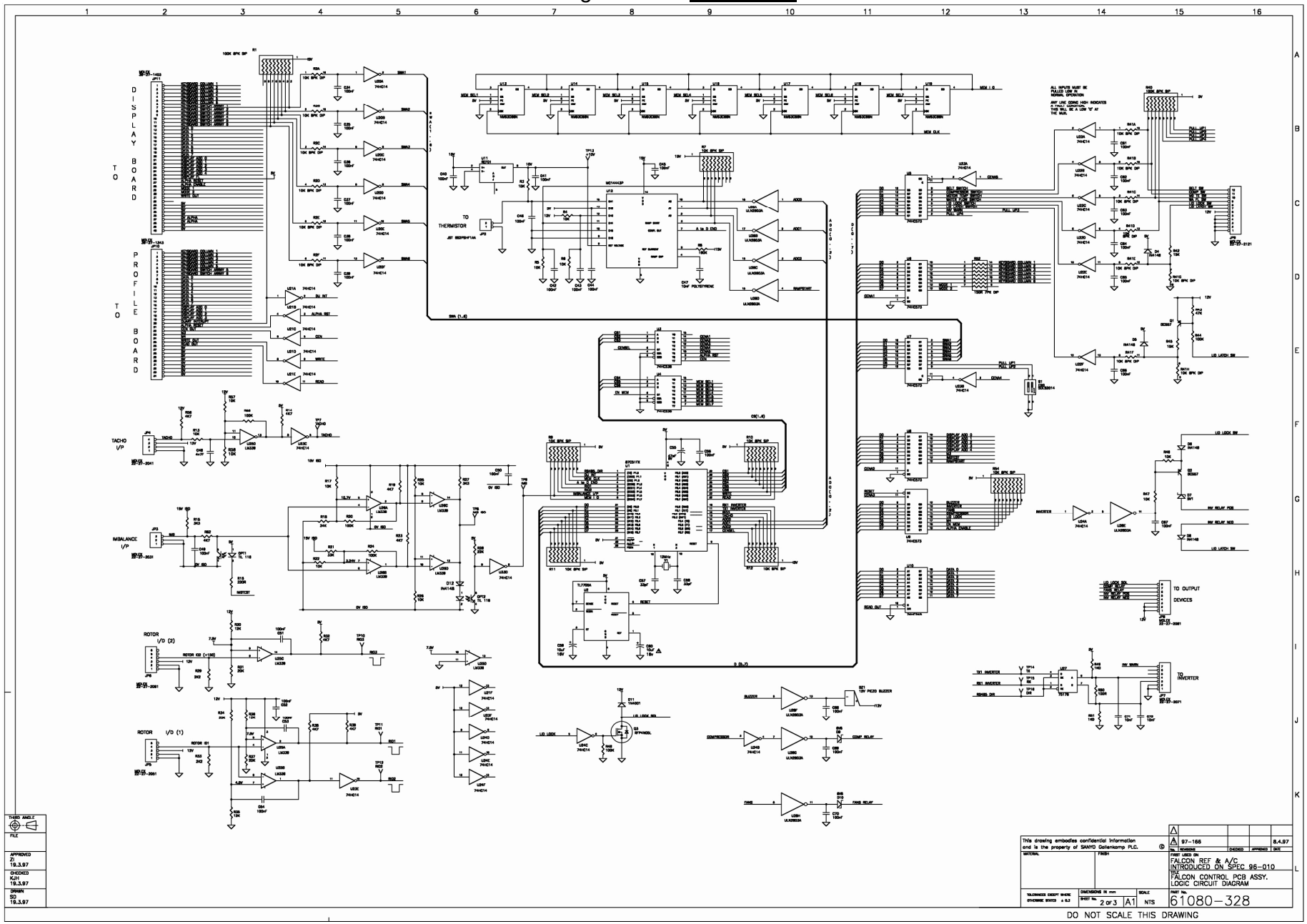
This drawing embodies confidential information and is the property of SANYO Gallenkamp PLC.

⚠ 97-166				8.4.97
No.	REVISIONS	DRAWN	CHECKED	APPROVED	DATE

MATERIAL: SEE PARTS LIST
FINISH: NATURAL
FIRST USED ON: FALCON 6/300 REF & A/C
FIRST INTRODUCED ON SPEC 96-010
TITLE: FALCON CONTROL PCB ASSEMBLY
TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 0.3
DIMENSIONS IN mm
SHEET No. 1 OF 3
SCALE: A1 NTS
PART No. 61080-328

DO NOT SCALE THIS DRAWING

Drawing Number: 61080-328


TO DISPLAY BOARD
TO PROFILE BOARD
TACHO I/P
IMBALANCE I/P
ROTOR I/D (2)
ROTOR I/D (1)
TO THERMISTOR
TO OUTPUT DEVICES
TO INVERTER
ALL INPUTS MUST BE PULLED LOW IN NORMAL OPERATION
ANY LINE GOING HIGH INDICATES A FAULT CONDITION. THIS WILL BE A LOW "0" AT THE MUX.
DO NOT SCALE THIS DRAWING

THIRD ANGLE	
FILE	
APPROVED JI 19.3.97	
CHECKED KJH 19.3.97	
DRAWN SD 19.3.97	

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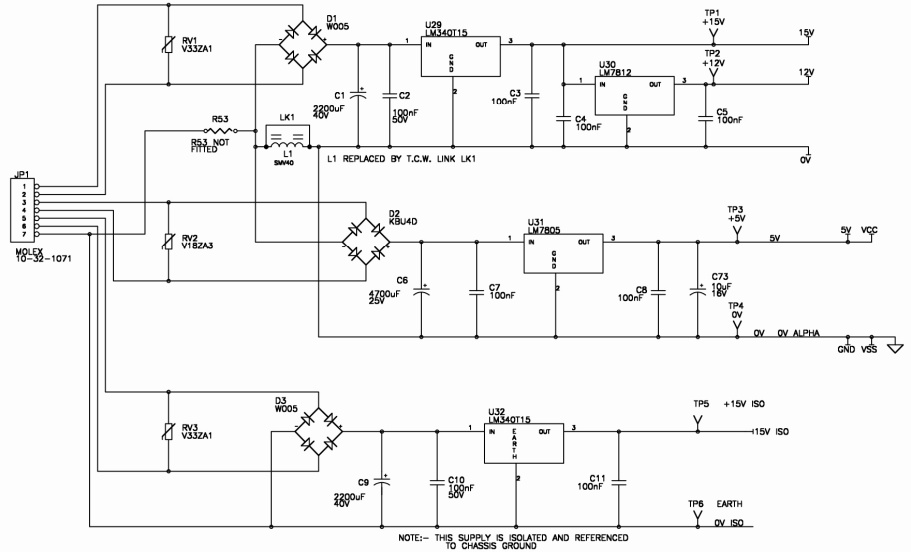
MATERIAL	FINISH		
TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 0.3	DIMENSIONS IN mm	SCALE NTS	PART No. 61080-328
	SHEET No. 2 OF 3	A1	

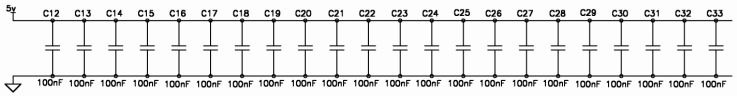
No.	REVISIONS	CHECKED	APPROVED	DATE
1	97-166			8.4.97

FIRST USED ON
FALCON REF & A/C INTRODUCED ON SPEC 96-010

TITLE
FALCON CONTROL PCB ASSY. LOGIC CIRCUIT DIAGRAM

Drawing Number: 61080-328





THIRD ANGLE	
FILE	
APPROVED ZI 19.3.97	
CHECKED KJH 19.3.97	
DRAWN SD 19.3.97	

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No.	REVISIONS	CHECKED	APPROVED	DATE
1	97-166			8.4.97

MATERIAL | FINISH

FIRST USED ON
FALCON REF & A/C
INTRODUCED ON SPEC 96-010

TITLE
FALCON CONTROL PCB ASSY.
POWER CIRCUIT DIAGRAM

TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 0.3

DIMENSIONS IN mm

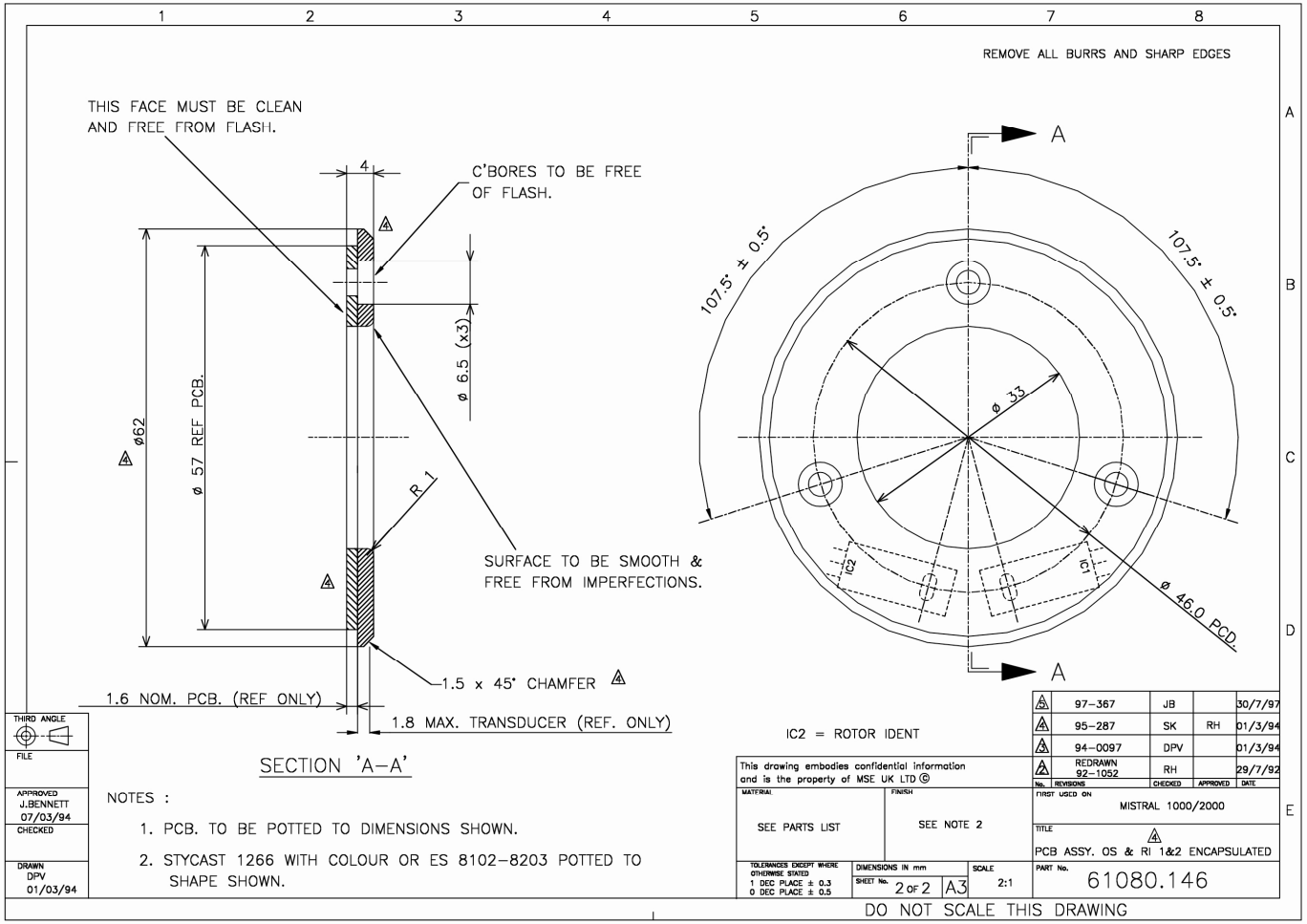
SHEET No. 3 OF 3 A3

SCALE NTS

PART No. 61080-328

DO NOT SCALE THIS DRAWING

Drawing Number: 61080-146


REMOVE ALL BURRS AND SHARP EDGES
THIS FACE MUST BE CLEAN AND FREE FROM FLASH.
C'BORES TO BE FREE OF FLASH.
4
ø 6.5 (x3)
ø62
ø 57 REF PCB.
R 1
SURFACE TO BE SMOOTH & FREE FROM IMPERFECTIONS.
1.5 x 45° CHAMFER
1.6 NOM. PCB. (REF ONLY)
1.8 MAX. TRANSDUCER (REF. ONLY)
SECTION 'A–A'
A
107.5° ± 0.5°
107.5° ± 0.5°
ø 33
IC2
IC1
ø 46.0 PCD.
IC2 = ROTOR IDENT
NOTES :
1. PCB. TO BE POTTED TO DIMENSIONS SHOWN.
2. STYCAST 1266 WITH COLOUR OR ES 8102–8203 POTTED TO SHAPE SHOWN.
THIRD ANGLE
FILE
APPROVED J.BENNETT 07/03/94
CHECKED
DRAWN DPV 01/03/94
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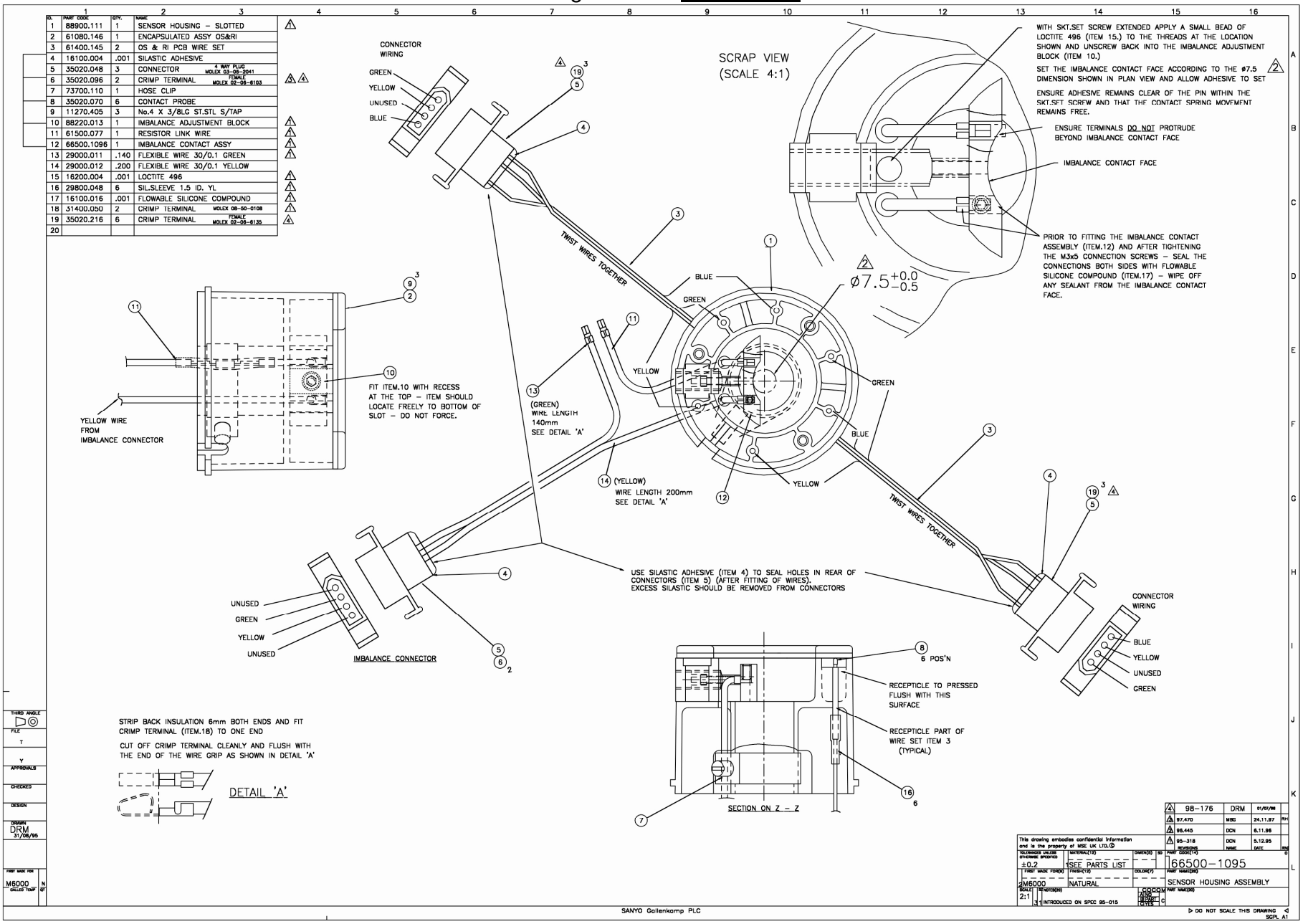
MATERIAL SEE PARTS LIST
FINISH SEE NOTE 2
TOLERANCES EXCEPT WHERE OTHERWISE STATED 1 DEC PLACE ± 0.3 0 DEC PLACE ± 0.5
DIMENSIONS IN mm
SHEET No. 2 OF 2 A3
SCALE 2:1
PART No. 61080.146
FIRST USED ON MISTRAL 1000/2000
TITLE PCB ASSY. OS & RI 1&2 ENCAPSULATED
No. REVISIONS CHECKED APPROVED DATE
97–367 JB 30/7/97
95–287 SK RH 01/3/94
94–0097 DPV 01/3/94
REDRAWN 92–1052 RH 29/7/92
DO NOT SCALE THIS DRAWING

Drawing Number: 66500-1095

ID.	PART CODE	QTY.	NAME
1	88900.111	1	SENSOR HOUSING – SLOTTED
2	61080.146	1	ENCAPSULATED ASSY OS&RI
3	61400.145	2	OS & RI PCB WIRE SET
4	16100.004	.001	SILASTIC ADHESIVE
5	35020.048	3	CONNECTOR 4 WAY PLUG MOLEX 03-06-2041
6	35020.096	2	CRIMP TERMINAL FEMALE MOLEX 02-06-8103
7	73700.110	1	HOSE CLIP
8	35020.070	6	CONTACT PROBE
9	11270.405	3	No.4 X 3/8LG ST.STL S/TAP
10	88220.013	1	IMBALANCE ADJUSTMENT BLOCK
11	61500.077	1	RESISTOR LINK WIRE
12	66500.1096	1	IMBALANCE CONTACT ASSY
13	29000.011	.140	FLEXIBLE WIRE 30/0.1 GREEN
14	29000.012	.200	FLEXIBLE WIRE 30/0.1 YELLOW
15	16200.004	.001	LOCTITE 496
16	29800.048	6	SIL.SLEEVE 1.5 ID. YL
17	16100.016	.001	FLOWABLE SILICONE COMPOUND
18	31400.050	2	CRIMP TERMINAL MOLEX 08-50-0108
19	35020.216	6	CRIMP TERMINAL FEMALE MOLEX 02-06-8135
20			


CONNECTOR WIRING
GREEN
YELLOW
UNUSED
BLUE
TWIST WIRES TOGETHER
SCRAP VIEW (SCALE 4:1)
WITH SKT.SET SCREW EXTENDED APPLY A SMALL BEAD OF LOCTITE 496 (ITEM 15.) TO THE THREADS AT THE LOCATION SHOWN AND UNSCREW BACK INTO THE IMBALANCE ADJUSTMENT BLOCK (ITEM 10.)
SET THE IMBALANCE CONTACT FACE ACCORDING TO THE ø7.5 DIMENSION SHOWN IN PLAN VIEW AND ALLOW ADHESIVE TO SET
ENSURE ADHESIVE REMAINS CLEAR OF THE PIN WITHIN THE SKT.SET SCREW AND THAT THE CONTACT SPRING MOVEMENT REMAINS FREE.
ENSURE TERMINALS DO NOT PROTRUDE BEYOND IMBALANCE CONTACT FACE
IMBALANCE CONTACT FACE
PRIOR TO FITTING THE IMBALANCE CONTACT ASSEMBLY (ITEM.12) AND AFTER TIGHTENING THE M3x5 CONNECTION SCREWS – SEAL THE CONNECTIONS BOTH SIDES WITH FLOWABLE SILICONE COMPOUND (ITEM.17) – WIPE OFF ANY SEALANT FROM THE IMBALANCE CONTACT FACE.
ø7.5 +0.0 −0.5
BLUE
GREEN
YELLOW
GREEN
BLUE
YELLOW
TWIST WIRES TOGETHER
YELLOW WIRE FROM IMBALANCE CONNECTOR
FIT ITEM.10 WITH RECESS AT THE TOP – ITEM SHOULD LOCATE FREELY TO BOTTOM OF SLOT – DO NOT FORCE.
(GREEN) WIRE LENGTH 140mm SEE DETAIL 'A'
(YELLOW) WIRE LENGTH 200mm SEE DETAIL 'A'
USE SILASTIC ADHESIVE (ITEM 4) TO SEAL HOLES IN REAR OF CONNECTORS (ITEM 5) (AFTER FITTING OF WIRES). EXCESS SILASTIC SHOULD BE REMOVED FROM CONNECTORS
UNUSED
GREEN
YELLOW
UNUSED
IMBALANCE CONNECTOR
CONNECTOR WIRING
BLUE
YELLOW
UNUSED
GREEN
6 POS'N
RECEPTICLE TO PRESSED FLUSH WITH THIS SURFACE
RECEPTICLE PART OF WIRE SET ITEM 3 (TYPICAL)
SECTION ON Z – Z
STRIP BACK INSULATION 6mm BOTH ENDS AND FIT CRIMP TERMINAL (ITEM.18) TO ONE END
CUT OFF CRIMP TERMINAL CLEANLY AND FLUSH WITH THE END OF THE WIRE GRIP AS SHOWN IN DETAIL 'A'
DETAIL 'A'

4	98–176	DRM	01/07/98
3	97.470	MBG	24.11.97
2	96.445	DCN	6.11.96
1	95–318	DCN	5.12.95
REVISIONS		NAME	DATE

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TOLERANCES UNLESS OTHERWISE SPECIFIED	±0.2
MATERIAL(13)	SEE PARTS LIST
FINISH(12)	NATURAL
DIMEN(10)	
COLOR(11)	
PART CODE(14)	66500–1095
PART NAME(20)	SENSOR HOUSING ASSEMBLY
FIRST MADE FOR(9)	2M6000
SCALE(7)	2:1
WEIGHT(8)	
SIZE	A3
CAGE CODE	C

INTRODUCED ON SPEC 95-015

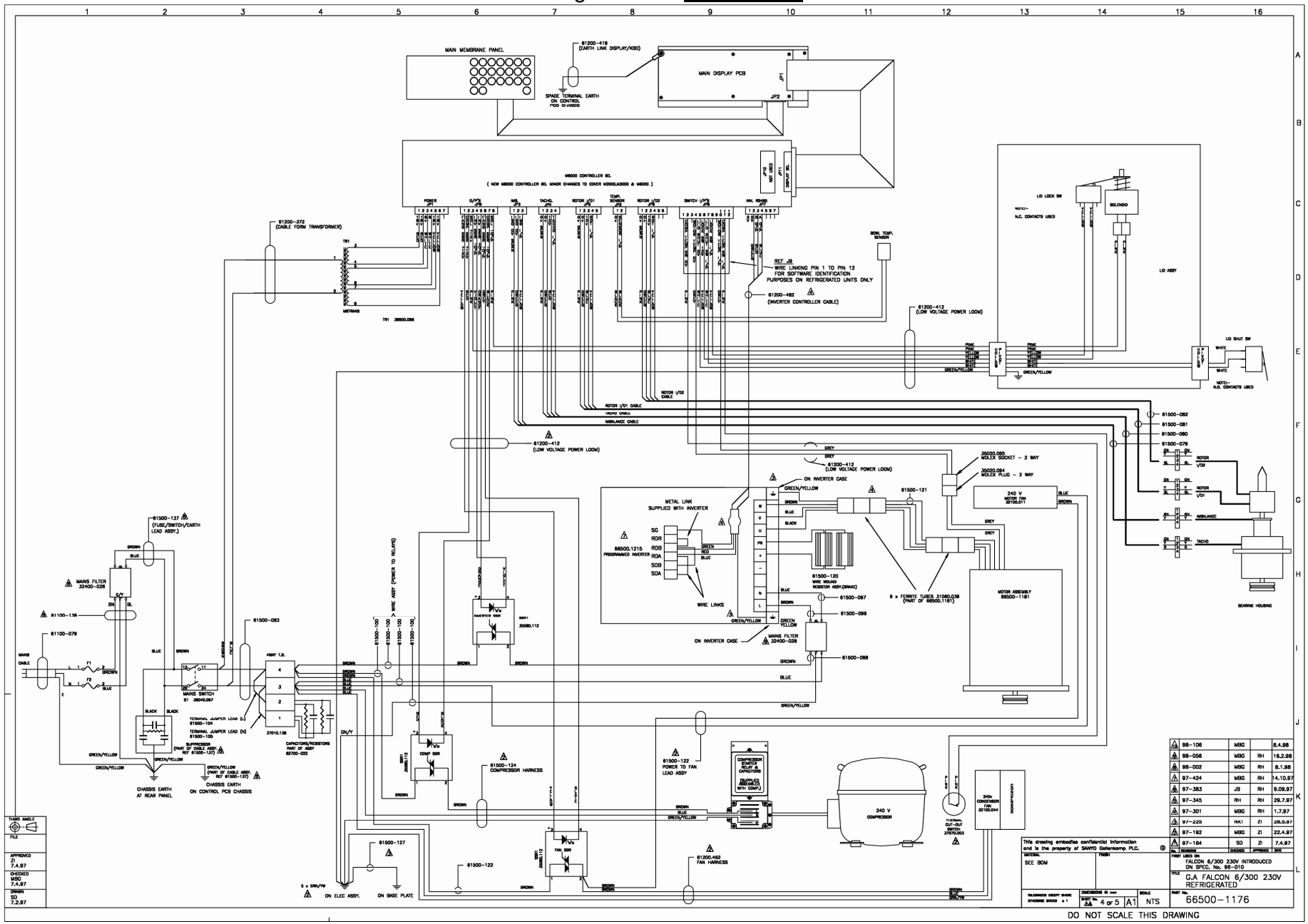
THIRD ANGLE | FILE T | Y APPROVALS | CHECKED | DESIGN | DRAWN DRM 31/08/95 | FIRST MADE FOR M6000 | N/A

SANYO Gallenkamp PLC

DO NOT SCALE THIS DRAWING

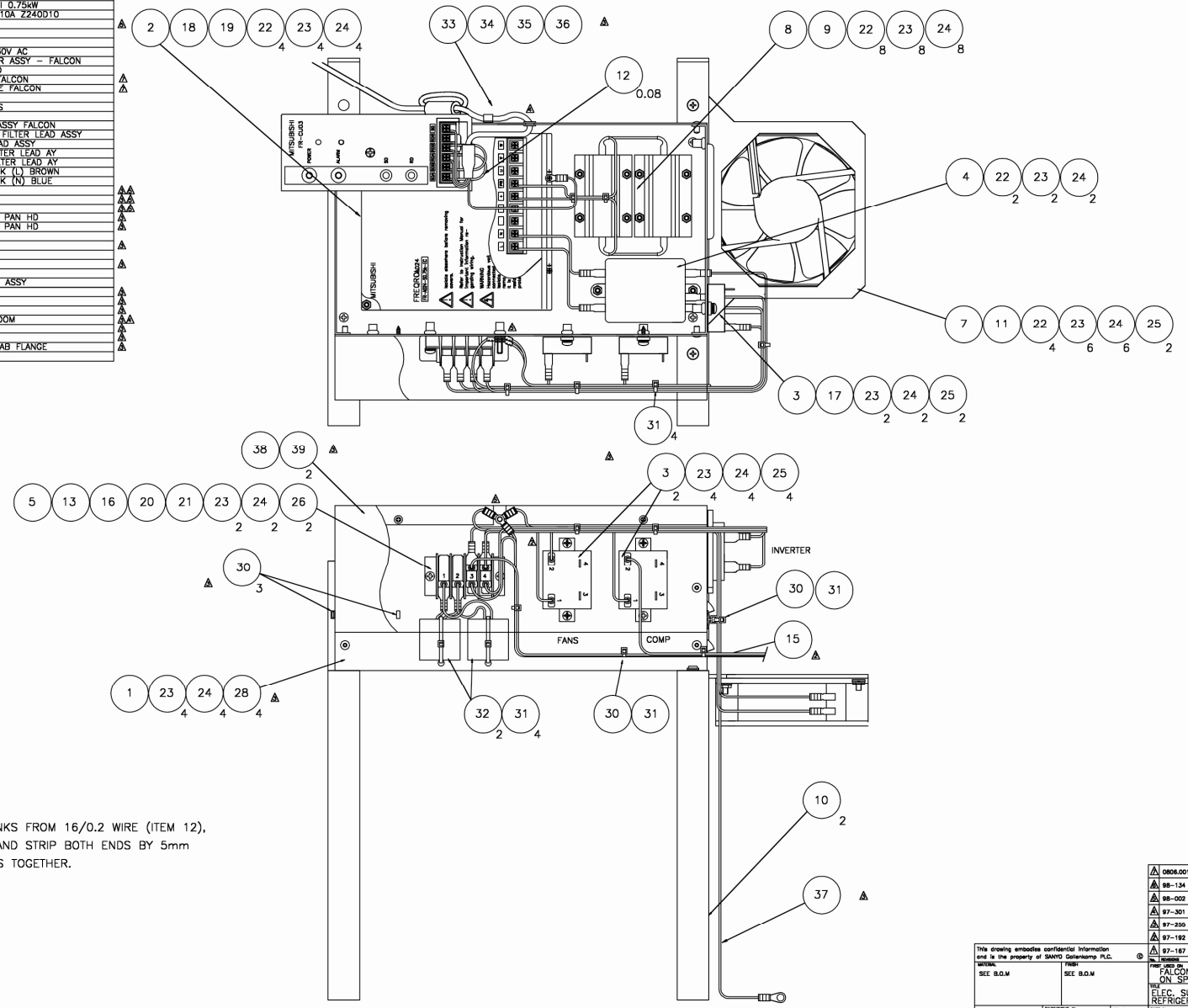
SGPL A1

Drawing Number: 66500-1176



Drawing Number: 66500-1197

ITEM	PART No.	QTY	DESCRIPTION
1	96500.991	1	INVERTER ENCLOSURE ASSEMBLY
2	43060.012	1	INVERTER, MITSUBISHI 0.75kW
3	35080.112	3	SOLID STATE RELAY 10A Z240D10
4	32400.028	1	POWER LINE FILTER
5	37010.138	1	TERMINAL BLOCK 4W
7	32100.011	1	FAN 120X120X38 230V AC
8	61500.120	1	WIREWOUND RESISTOR ASSY - FALCON
9	16100.002	0.001	HEATSINK COMPOUND
10	96500.983A	2	INVERTER BRACKET FALCON
11	96500.990A	1	FAN MOUNTING PLATE FALCON
12	29000.007	0.08	PVC WIRE 16/0.2
13	61500.122	1	MOTOR FAN HARNESS
15	61500.124	1	COMPRESSOR WIRE ASSY FALCON
16	61500.100	1	POWER TO RELAY / FILTER LEAD ASSY
17	61500.098	1	FILTER TO RELAY LEAD ASSY
18	61500.096	1	INVERTER (L) TO FILTER LEAD AY
19	61500.097	1	INVERTER (N) TO FILTER LEAD AY
20	61500.104	1	TERMINAL BLOCK LINK (L) BROWN
21	61500.105	1	TERMINAL BLOCK LINK (N) BLUE
22	12260.400	18	NUT M4 HEX
23	13160.400	32	WASHER M4 PLAIN
24	13360.400	32	WASHER M4 SPRING
25	11060.416	8	SCREW M4 X 16 LG PAN HD
26	11060.420	2	SCREW M4 X 20 LG PAN HD
28	11060.412	4	M4 x 12 PAN HEAD
30	15400.017	5	CABLE TIE HOLDER
31	15400.003	10	CABLE TIE
32	62700.022	2	CAPACITOR/RESISTOR ASSY
33	31100.017	1	"P" CLIP
34	11070.312	1	M3 x 12 PAN HEAD
35	13160.300	1	M3 PLAIN WASHER
36	61200.482	1	INVERTER COMMS. LOOM
37	61500.127	1	EARTH LEAD
38	96501.061	1	PRESSPAHN COVER
39	11260.809	2	NO.8 x 3/8 S/TAP AB FLANGE
40			



NOTE

MAKE TWO WIRE LINKS FROM 16/0.2 WIRE (ITEM 12), CUT 40mm LONG AND STRIP BOTH ENDS BY 5mm AND TWIST STRANDS TOGETHER.

0806.001	PM	PM	26.06.08
98-134	MBC		5.5.98
98-002	MBC	RH	13.1.98
97-301	MBC	RH	30.6.97
97-255	MBC	ZI	21.5.97
97-192	SD	ZI	22.4.97
97-187	SD	ZI	8.4.97
NO.	REVISION	CHECKED	APPROVED DATE

THIRD ANGLE | FILE | APPROVED ZI 1.4.97 | CHECKED SD 1.4.97 | DRAWN MBC 6.3.97

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MATERIAL: SEE B.O.M | FINISH: SEE B.O.M

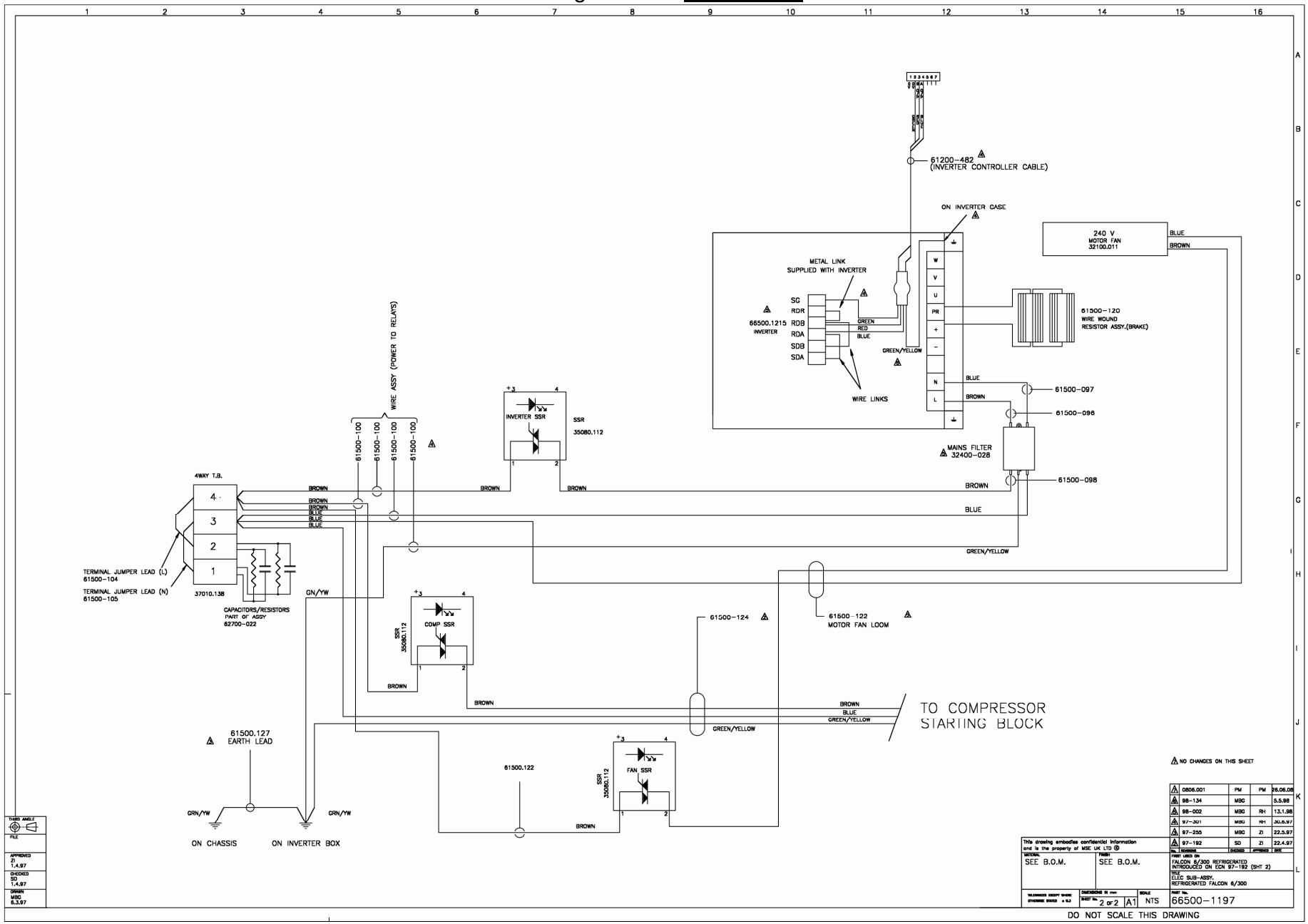
FIRST USED ON: FALCON 6/300 INTRODUCED ON SPEC. No. 95-010

TITLE: ELEC. SUB-ASSY. REFRIGERATED FALCON 6/300

TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 0.2 | DIMENSIONS IN mm | SHEET No. 1 OF 2 | A1 | SCALE NTS | PART No. 66500.1197

DO NOT SCALE THIS DRAWING

Drawing Number: 66500-1197



NO CHANGES ON THIS SHEET

0806.001	PM	PM	26.06.08
98-134	MBC		5.5.98
98-002	MBC	RH	13.1.98
97-301	MBC	RH	30.5.97
97-255	MBC	ZI	22.5.97
97-192	SD	ZI	22.4.97

THIRD ANGLE

FILE

APPROVED ZI 1.4.97

CHECKED SD 1.4.97

DRAWN MBC 6.3.97

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MATERIAL: SEE B.O.M.

FINISH: SEE B.O.M.

FIRST USED ON: FALCON 6/300 REFRIGERATED INTRODUCED ON ECN 97-192 (SHT 2)

TITLE: ELEC SUB-ASSY. REFRIGERATED FALCON 6/300

TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 0.2

DIMENSIONS IN mm

SHEET No. 2 of 2 | A1

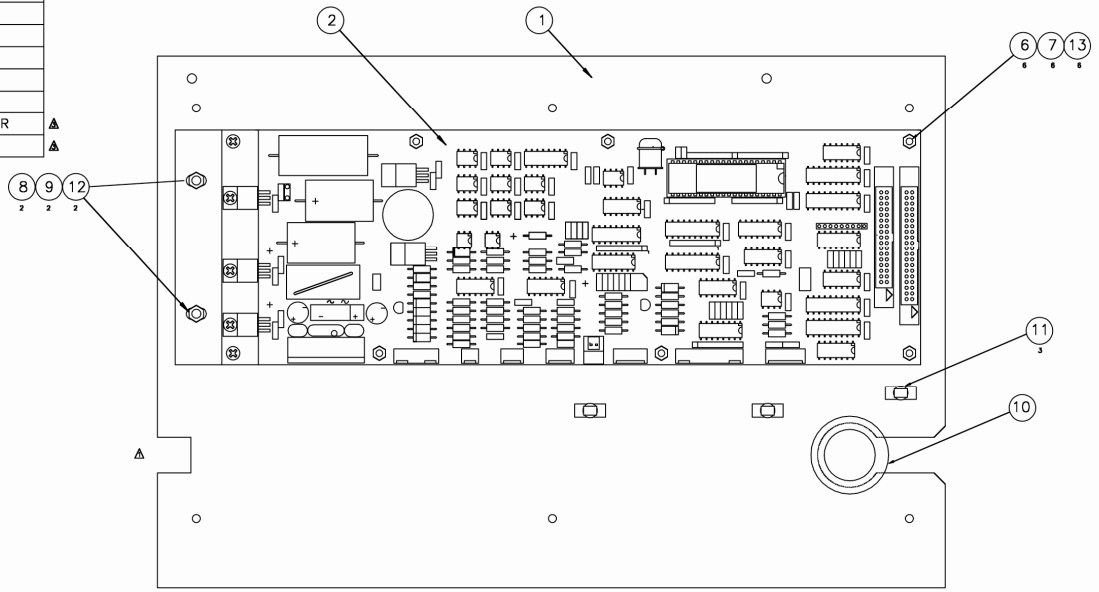
SCALE: NTS

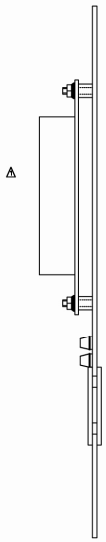
PART No. 66500-1197

DO NOT SCALE THIS DRAWING

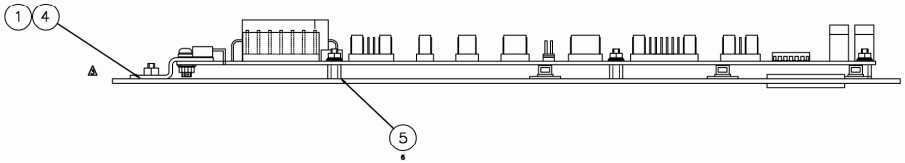
Drawing Number: 66500-1100

REF	PART CODE	QTY	NAME	
1	96500.858	1	PCB CHASSIS	
2	61080.328	1	CONTROL PCB FALCON	⚠
3				⚠
4	16100.002	0.001	HEATSINK COMPOUND	
5	14100.030	6	SPACER	
6	13160.300	6	M3 WASHER	
7	12260.300	6	M3 NUT	
8	13160.400	2	M4 WASHER	
9	12260.400	2	M4 NUT	
10	33040.235	1	GROMMET	
11	15400.017	3	TIE HOLDER	
12	13360.400	2	M4 SPRING WASHER	⚠
13	13260.300	6	M3 STAR WASHER	⚠





HEATSINK COMPOUND ON MATING FACE OF HEATSINK PLATE.



THIRD ANGLE

FILE

APPROVED AL 1-10-95

CHECKED AL 1-10-95

DRAWN AL 1-10-95

This drawing embodies confidential information and is the property of SANYO Oaterkamp PLC.

MATERIAL: SEE PARTS LIST

FINISH: NATURAL

TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 0.2

DIMENSIONS IN mm

SHEET No. 1 OF 1

A1

SCALE 1:1

No.	REVISIONS	CHECKED	APPROVED	DATE
97-140				
97-050	MH	RH		20.1.97
96-247	SK	SK		5-5-96
96-080	RH	RH		6-2-96

FIRST USED ON: M3000

TITLE: CONTROLLER PCB MTG ASSEMBLY

PART No. 66500.1100

DO NOT SCALE THIS DRAWING

Drawing Number: 66500-1141

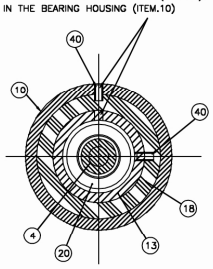
ITEM	PART CODE	QTY.	NAME
1	61080.054	1	TACHO PCB ASSY
2	66500.1095	1	SENSOR HOUSING ASSY
4	80000.062	1	SHAFT ASSY ⚠1
5	86150.021	1	END CAP / GUARD TUBE
8	72200.148	1	TACHO DISC
9	81170.003	1	PULLEY DIA. 70
10	81900.467	1	BEARING HOUSING MACHINED
11	86820.013	1	SPACER SMALL
12	86840.013	1	SPACER LARGE
13	86150.020	1	BEARING TUBE
15	87130.130	1	DRIVE HEAD
16	88140.009	1	INSULATOR
18	71500.057	2	DAMPING BUSH EPDM
20	73080.029	2	BALL BEARING 17 X 35 X 10
21	23400.012	.01	LOCTITE 601
22	16200.011	.01	LOCTITE ACTIVATOR 7471
24	11070.408	3	SCREW M4 X 8 ST.STL.POZI
25	11560.508	2	SKT.SET SCREW M5 X 8
26	86160.008	3	SUPPORT WASHER-BEARING HOUSING
27	86900.022	1	SUPPORT WASHER
28	13340.001	2	WASHER - FINGER SPRING
29	13460.001	1	WASHER - WAVEY PLW22
30	13470.002	1	WASHER - WAVEY M16 ST.STL.
31	13660.003	1	RET.RING 35mm INT-MR137
32	13660.004	1	RET.RING 60mm INT-MR236
33	13660.005	2	RET.RING 1.75" EXT-RS175
34	13660.006	1	RET.RING 16mm EXT-M562
35	13660.007	2	RET.RING 17mm EXT-M566
37	16100.004	.001	SILASTIC ADHESIVE
38	23400.014	.001	LOCTITE SCREW LOC 222E
40	14010.408	3	SPRING TENSION PIN
41	16200.014	.005	LOCTITE 290
42	13270.400	3	WASHER M4 S/P
43	11560.305	2	SKT.SET SCREW M3 X 5
44	16200.008	.001	LOCTITE 641
45	16100.016	.001	FLOWABLE SILICONE R'BR COMP'ND
46	15400.004	1	CABLE TIE
47	16200.026	.001	LOCTITE 7061 CLEANER/DEGREASER
48	71500.056	1	DAMPING BUSH POLYNOR

NOTE

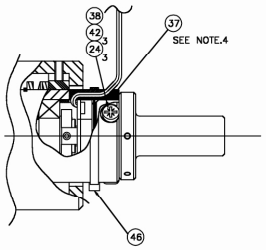
SIMILAR TO M6000 BEARING HOUSING ⚠2
PART No. 66500.1094.

NOTE ALSO THE ADDITION OF THE ISSUE NUMBER TO THE ENGRAVED DATA ON THE BEARING HOUSING.

NOTE THE ALIGNMENT OF THE SLOT IN BEARING TUBE IN RELATION TO THE 2 SPRING TENSION PINS (ITEM.40) LOCATIONS IN THE BEARING HOUSING (ITEM.10)

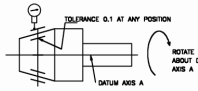


SCRAP VIEW SHOWING
TACHO PCB WIRING ROUTE.
SENSOR HOUSING NOT SHOWN FOR CLARITY.



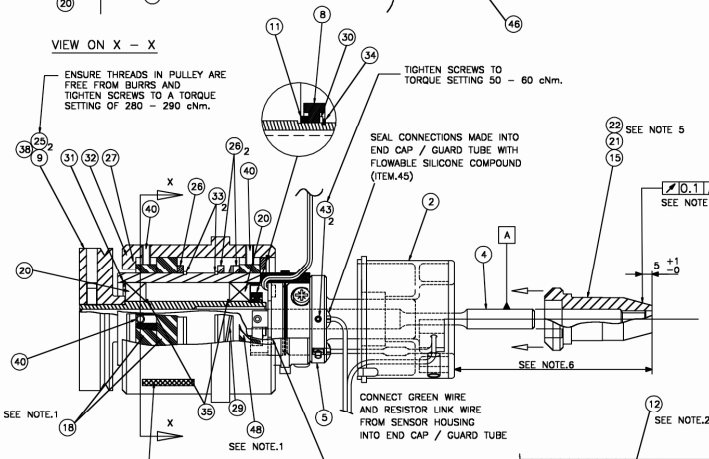
NOTES :-

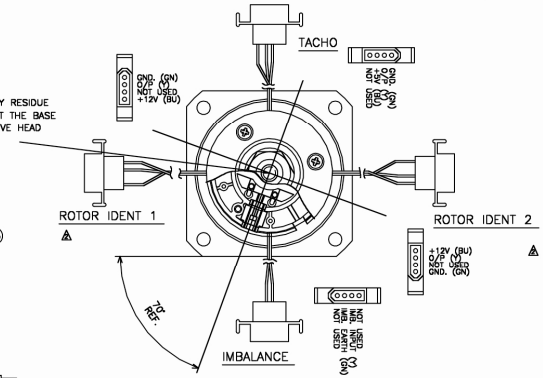
1. CHECK THE SHORE 'A' HARDNESS OF EACH DAMPING BUSH (ITEMS 18,48) IMMEDIATELY PRIOR TO ASSEMBLY – USE ONLY SELECTED DAMPING BUSHES MEASURING OVER 60G IN THE CASE OF ITEM 18 AND 30-40 FOR ITEM 48. USE WATER TO LUBRICATE THESE BUSHES DURING ASSEMBLY INTO THE BEARING HOUSING (ITEM.10)
2. NOTCH IN SPACER (ITEM 12), MUST LINE UP WITH SLOT IN BEARING TUBE (ITEM 13).
3. TACHO PCB ASSEMBLY (ITEM 1), MUST BE POSITIONED WITH SENSOR POINTING TOWARDS BEARING (ITEM 20), AND WIRES THROUGH SLOTS IN ITEMS 12 AND 13.
4. SLOT IN BEARING TUBE TO BE FILLED WITH SILASTIC ADHESIVE (ITEM 37) ENSURING THAT THE WIRES FROM THE TACHO PCB RUN VERTICALLY IN SLOT AS SHOWN. CARE MUST BE TAKEN TO ENSURE THAT SILASTIC ADHESIVE DOES NOT AFFECT THE OPERATION OF SPRING WASHERS (ITEM 28).
5. TO ASSEMBLE THE DRIVE HEAD (ITEM 15) TO SHAFT (ITEM 4) FIRST DEGREASE DRIVE HEAD, AND SHAFT USING LOCTITE DEGREASER (ITEM 47). ASSEMBLE DRIVE HEAD TO SHAFT USING LOCTITE 601 (ITEM 21) AND ACTIVATOR (ITEM 22).APPLY ACTIVATOR TO BOTH MATING SURFACES, AND ADHESIVE AROUND ENTRANCE TO DRIVE HEAD AND TOP EDGE OF SHAFT. SLIDE THE DRIVE HEAD ONTO THE SHAFT, TWISTING THE DRIVE HEAD SO THAT THE ADHESIVE IS DISTRIBUTED EVENLY. ENSURE THAT AN INTERNAL CLEARANCE OF 0.5mm IS SET BETWEEN THE DRIVE HEAD AND THE TOP OF THE DRIVE SHAFT. THE BEARING HOUSING SHOULD BE IN AN UPRIGHT POSITION WHEN THE DRIVE HEAD IS ASSEMBLED AND REMAIN UPRIGHT UNTIL THE ADHESIVE HAS SET. REMOVE ANY RESIDUE ADHESIVE VISIBLE AT THE BASE OF THE DRIVE HEAD THREAD
6. USE SETTING BLOCK (TOOL No.T15972) ATTACHED TO THE DRIVE HEAD TO SET THE CORRECT POSITION OF THE ROTOR IDENT. HOUSING (ITEM 2). ON THE END CAP / GUARD TUBE (ITEM 5).
7. ENGRAVE APPROPRIATE SERIAL No. IN POSITION SHOWN ON BODY OF BEARING HOUSING (ITEM 10) RECORD IN A LOG BOOK, KEPT SPECIFICALLY FOR THE PURPOSE,
   a) SERIAL NUMBER
   b) RUN OUT
   c) DATE
   d) ISS.No.
8. AT THE PERIPHERY OF ANY CROSS SECTION , RUN-OUT IS NOT TO EXCEED 0.1 MEASURED NORMAL TO THE TOLERANCED SURFACE DURING ONE COMPLETE REVOLUTION OF THE PART ABOUT THE DATUM AXIS. SEE SCRAP VIEW FOR INTERPRETATION.



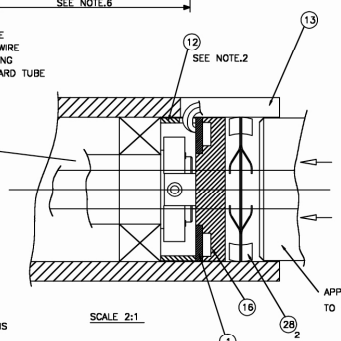
SCRAP VIEW SHOWING RUN OUT

VIEW ON X – X


ENSURE THREADS IN PULLEY ARE FREE FROM BURRS AND TIGHTEN SCREWS TO A TORQUE SETTING OF 280 – 290 cNm.
TIGHTEN SCREWS TO TORQUE SETTING 50 – 60 cNm.
SEAL CONNECTIONS MADE INTO END CAP / GUARD TUBE WITH FLOWABLE SILICONE COMPOUND (ITEM.45)
SEE NOTE 5
0.1 A
SEE NOTE 8.
SEE NOTE.6
SEE NOTE.1
SEE NOTE.1
CONNECT GREEN WIRE AND RESISTOR LINK WIRE FROM SENSOR HOUSING INTO END CAP / GUARD TUBE
ENGRAVE SERIAL No.
RUN OUT
DATE
ISS.No.
IN THIS AREA – SEE NOTE 7.

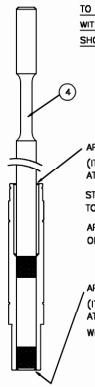


DRIVE HEAD NOT SHOWN FOR CLARITY



SCALE 2:1

TO ENSURE CONTAINMENT OF THE NECKED SHAFT WITHIN THE QUILL SHAFT AT THE LOCATIONS SHOWN



APPLY 3 DROPS OF PENETRATING LOCTITE 290 (ITEM.41) TO THE TOP OF THE SHAFT ASSY AT THE LOCATION INDICATED.

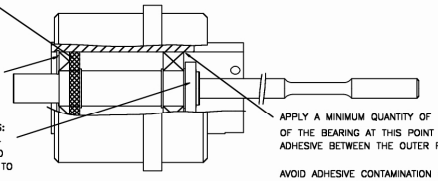
STAND VERTICALLY AS SHOWN TO ALLOW ADHESIVE TO REACH AND PENETRATE TOP SHAFT LOCATION

AFTER 5 MINUTES DRAIN AND WIPE SHAFT CLEAR OF EXCESS ADHESIVE

APPLY 1 DROP OF PENETRATING LOCTITE 290 (ITEM.41) TO THE BOTTOM OF THE SHAFT ASSY AT THE LOCATION INDICATED.

WIPE SHAFT END CLEAR OF EXCESS ADHESIVE

APPLY A LIGHT COAT OF LOCTITE 641 (ITEM.44) TO THIS AREA ON THE INSIDE OF THE BEARING TUBE (ITEM.13) PRIOR TO SEATING THE BEARING AGAINST THE RETAINING RING (ITEM.31)



WIPE OFF ANY EXCESS ADHESIVE AT THIS POINT.

ENSURE ITEMS: 11,8,30 & 34 ARE FITTED TO SHAFT PRIOR TO ASSEMBLY.

APPLY A MINIMUM QUANTITY OF LOCTITE 290 (ITEM.41) TO THE CIRCUMFERENCE OF THE BEARING AT THIS POINT – ALLOW CAPILLARY ACTION TO DRAW THE ADHESIVE BETWEEN THE OUTER RACE AND THE BEARING TUBE (ITEM.13)

AVOID ADHESIVE CONTAMINATION OF THE BEARING OR OTHER COMPONENTS IN THIS AREA WIPE OFF ANY REMAINING ADHESIVE FROM THE INSIDE OF THE BEARING TUBE.

THIRD ANGLE | FILE | APPROVED | CHECKED | DRAWN MSD 23.10.96

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NO.	REVISION	CHECKED	APPROVED	DATE
⚠2	97-381	DRM		16/09/97
⚠1	97-345	RH	RH	29.7.97

MATERIAL: SEE PARTS LIST | FINISH

FIRST USED ON M3000

INTRODUCED ON ECN 98-445

TITLE M3000 BEARING HOUSING (ADJUSTABLE IMBALANCE)

TOLERANCES UNLESS OTHERWISE SPECIFIED: ANGLES ± 0.5° LINEAR ± 0.13

DIMENSIONS IN mm | SHEET No. 1 OF 1 | A1 | SCALE 1:2

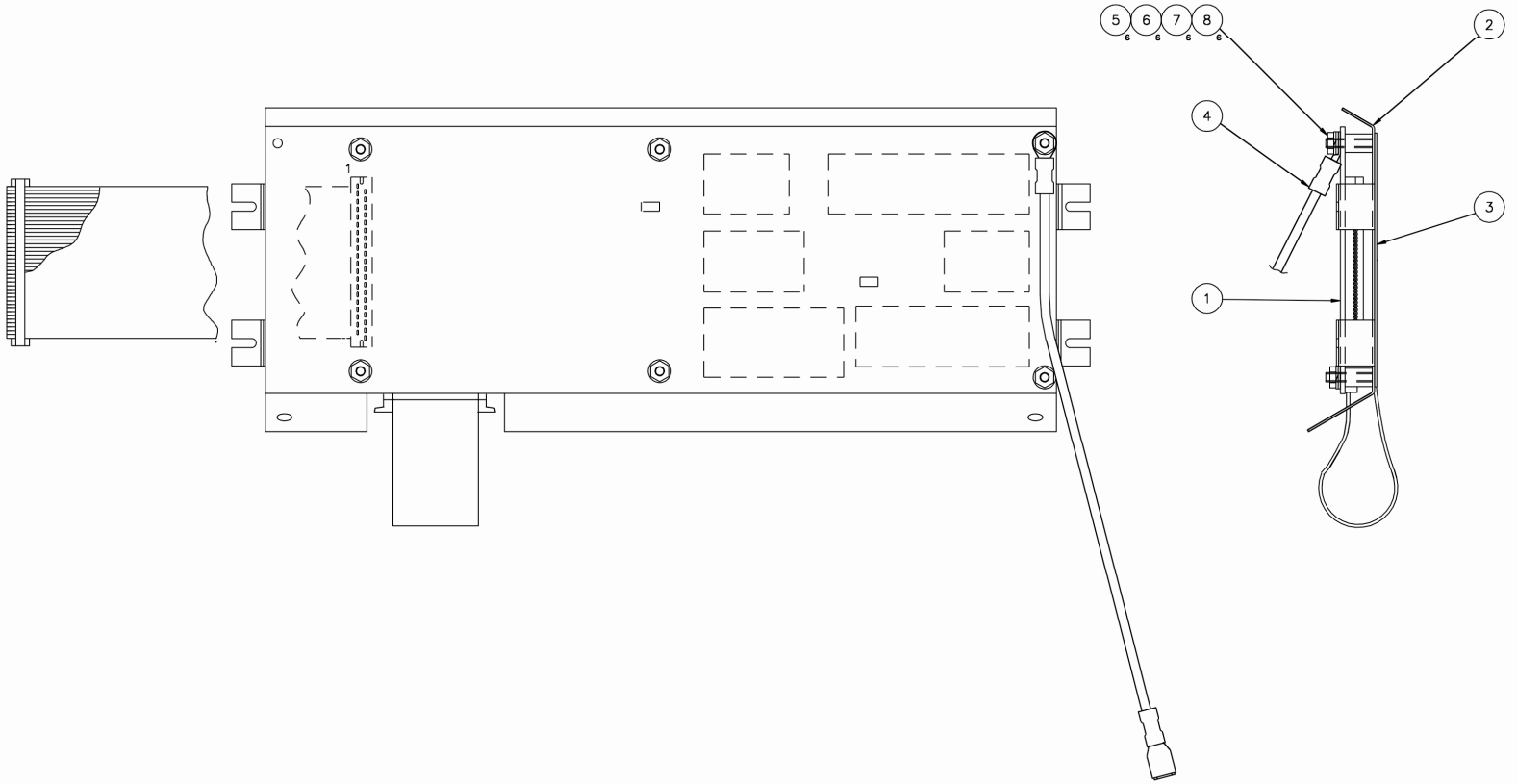
PART No. 66500.1141

DO NOT SCALE THIS DRAWING

Drawing Number: 66500-1179

ITEM	PART No.	QTY	DESCRIPTION
1	61080.325	1	DISPLAY BOARD ASSEMBLY
2	96500.982	1	DISPLAY SUPPORT
3	43400.031	1	MEMBRANE KEYBOARD
4	61200.419	1	EARTH LINK
5	12260.300	6	M3 NUT
6	13160.300	6	M3 PLAIN WASHER
7	13260.300	6	M3 SPRING WASHER
8	88110.067	6	PCB SPACER 3 ID x 6 LONG
9			
10			

REMOVE ALL BURRS AND SHARP EDGES



NOTE: INSERT LEAD FROM MEMBRANE INTO PCB PRIOR TO ASSEMBLY

THIRD ANGLE

FILE

APPROVED PW 22.07.08

CHECKED MK 22.07.08

DRAWN MBG 12.2.97

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MATERIAL: SEE PARTS LIST

FINISH: NATURAL

TOLERANCES UNLESS OTHERWISE SPECIFIED: DECIMALS ± 0.5, ANGLES ± 0°30'

DIMENSIONS IN mm

SHEET No. 1 OF 1 A2

SCALE 1:1

No. REVISIONS CHECKED APPROVED DATE

FIRST USED ON
FALCON 6/300 REFRIGERATED
FIRST INTRODUCED ON SPEC NO. 96-010

TITLE: FALCON DISPLAY AND KEYBOARD ASSEMBLY

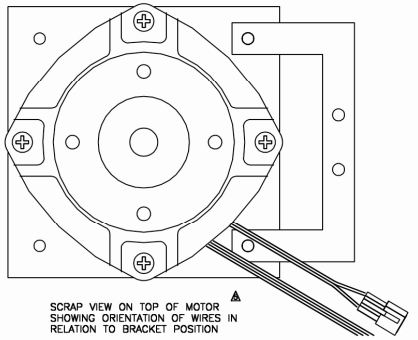
PART No. 66500.1179

DO NOT SCALE THIS DRAWING

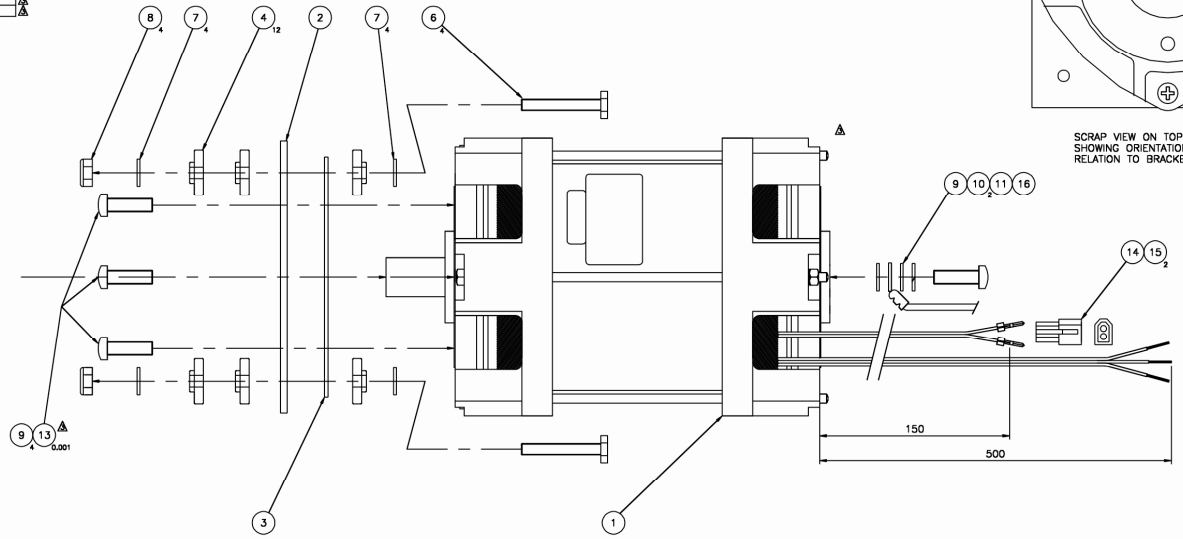
Drawing Number: 66500-1181

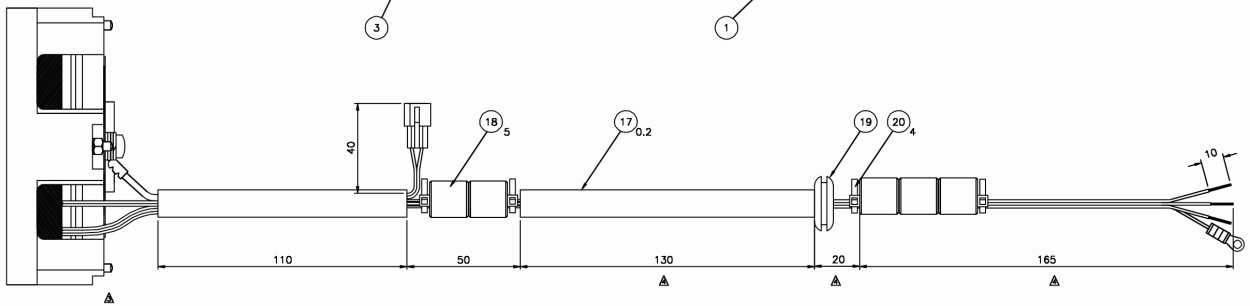
ITEM	PART No.	QTY	DESCRIPTION
1	34400.181	1	DRIVE MOTOR
2	96500.989	1	DRIVE MOTOR MOUNTING PLATE
3	96500.078	1	SPRING ANCHOR
4	88120.049	12	MOTOR MOUNTING SPACER
5			
6	11060.535	4	M5 x 35 HEX HEAD BOLT
7	13160.500	8	M5 PLAIN WASHER
8	12360.501	4	M5 NYLOC NUT
9	11060.620	5	M6 x 20 PAN HEAD
10	13160.600	2	M6 PLAIN WASHER
11	13260.600	1	M6 SPRUNG WASHER
12			
13	23400.014	0.001	LOCTITE SCREWLOCK 222E
14	35020.094	1	2 WAY MOLEX PLUG HOUSING
15	35020.281	2	MOLEX PLUG CRIMP
16	61500.121	1	MOTOR EARTH CABLE ASSY
17	31300.001	0.24M	SPIRAL WRAP
18	31060.039	5	FERRITE TUBE
19	33040.174	1	GROMMET
20	15400.003	4	CABLE TIE

REMOVE ALL BURRS AND SHARP EDGES



SCRAP VIEW ON TOP OF MOTOR SHOWING ORIENTATION OF WIRES IN RELATION TO BRACKET POSITION





NOTES:

CUT THE PAIR OF BLACK MOTOR CUT OUT WIRES TO LENGTH AND ATTACH CRIMPS (ITEM 15.)
LEAVE THE THREE MOTOR POWER WIRES BROWN, BLUE AND BLACK UNSTRIPPED AND AT FULL LENGTH UNTIL THE ASSEMBLY IS COMPLETE.

CUT SPIRAL WRAP (ITEM 17) TO LENGTHS SHOWN.

ATTACH EARTH LEAD (ITEM 16) AS SHOWN AND FEED ALL SIX WIRES THROUGH 110mm LENGTH OF SPIRAL WRAP. INSERT THERMAL CUT OUT WIRES (BLACK) INTO THE TWO WAY MOLEX SHELL (ITEM 14) IN EITHER POSITION AND SECURE TWO FERRITES (ITEM 18) WHERE SHOWN USING TWO CABLE TIES. CUT CABLE TIES LEAVING A LONG TAIL TO ENSURE THE FERRITES REMAIN IN POSITION.

REPEAT FOR SECOND LENGTH OF SPIRAL WRAP, GROMMET AND REMAINING FERRITES.

FINALLY CUT THE THREE MOTOR POWER WIRES TO LENGTH AND STRIP BACK 10mm.

00-206	ML		12.10.00
00-161	ML		1.9.00
97-301	MBC		27.5.97
97-255	MBC	ZI	13.5.97
97-193	MBC	ZI	21.4.97
97-189	SD	ZI	9.4.97

NO.	REVISION	CHECKED	APPROVED	DATE

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THIRD ANGLE

FILE

APPROVED ZI 12.3.97

CHECKED SD 12.3.97

DRAWN MBC 5.3.97

MATERIAL: SEE NOTES

FINISH: NATURAL

FIRST USED ON: FALCON 6/300 INTRODUCED ON SPEC. No. 96-010

TITLE: DRIVE MOTOR ASSEMBLY

TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 0

DIMENSIONS IN mm

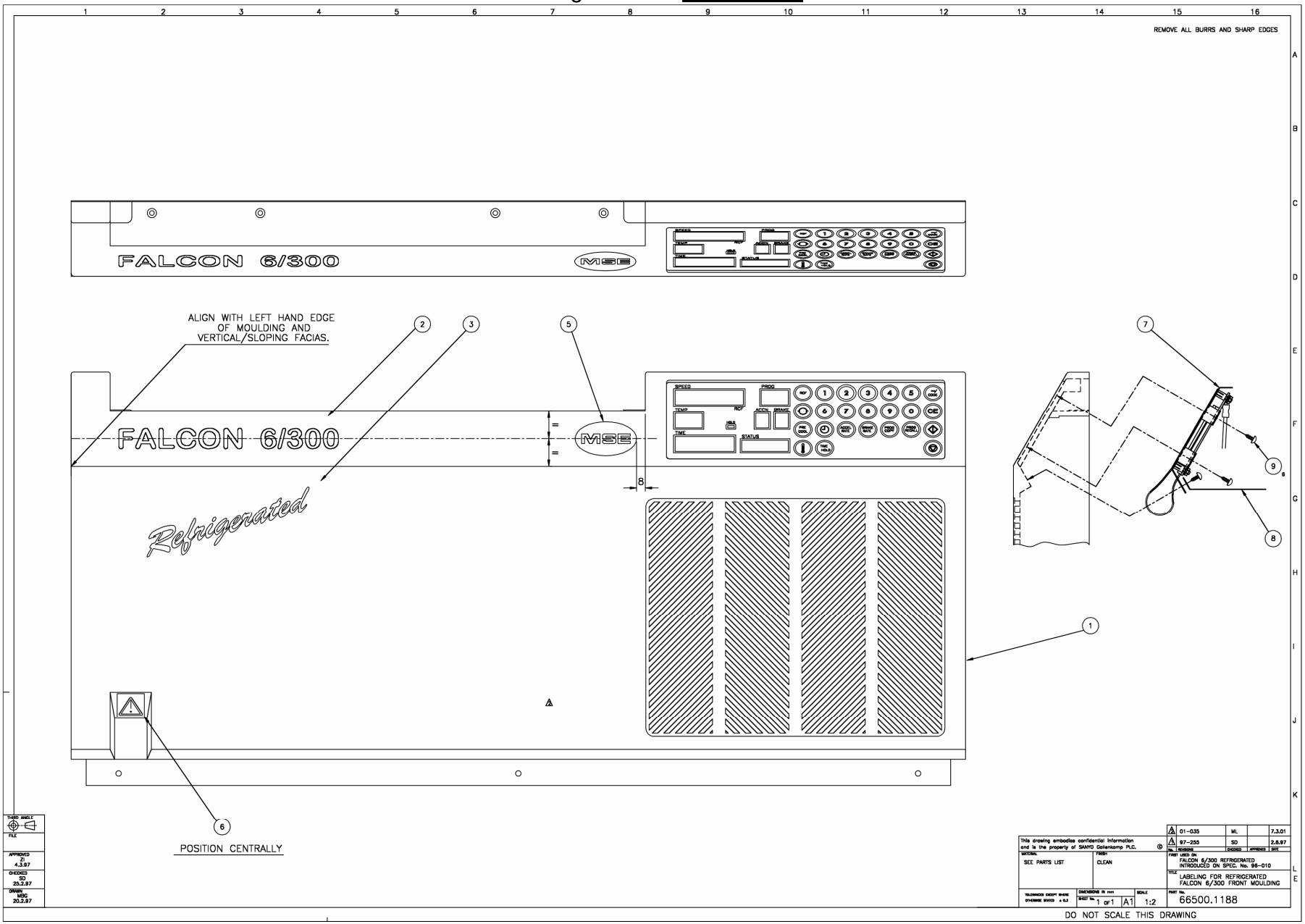
SHEET No. 1 OF 1 | A1

SCALE 1:1

PART No. 66500.1181

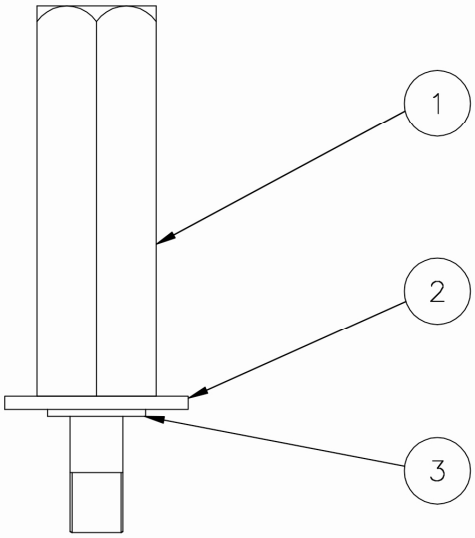
DO NOT SCALE THIS DRAWING

Drawing Number: 66500-1188



Drawing Number: 66500-1190

ITEM	PART No.	QTY	DESCRIPTION
1	87320.027	1	CLAMP BOLT FALCON
2	96500.346	1	CLAMP BOLT WASHER
3	14030.002	1	8mm PUSH ON FASTENER
4			
5			



NOTE

PUSH SPRING RETAINER (ITEM 3) FULLY ONTO SHAFT.

THIRD ANGLE

FILE

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No.	REVISIONS	CHECKED	APPROVED	DATE

APPROVED PM 11.05.06

CHECKED PM 11.05.06

DRAWN MBG 25.2.97

MATERIAL: SEE PARTS LIST

FINISH: CLEAN

TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 0.3

DIMENSIONS IN mm

SHEET No. 1 OF 1 A4

SCALE 1:1

FIRST USED ON: FALCON 6/300 INTRODUCED ON SPEC. No. 96–010

TITLE: CLAMP BOLT ASSEMBLY

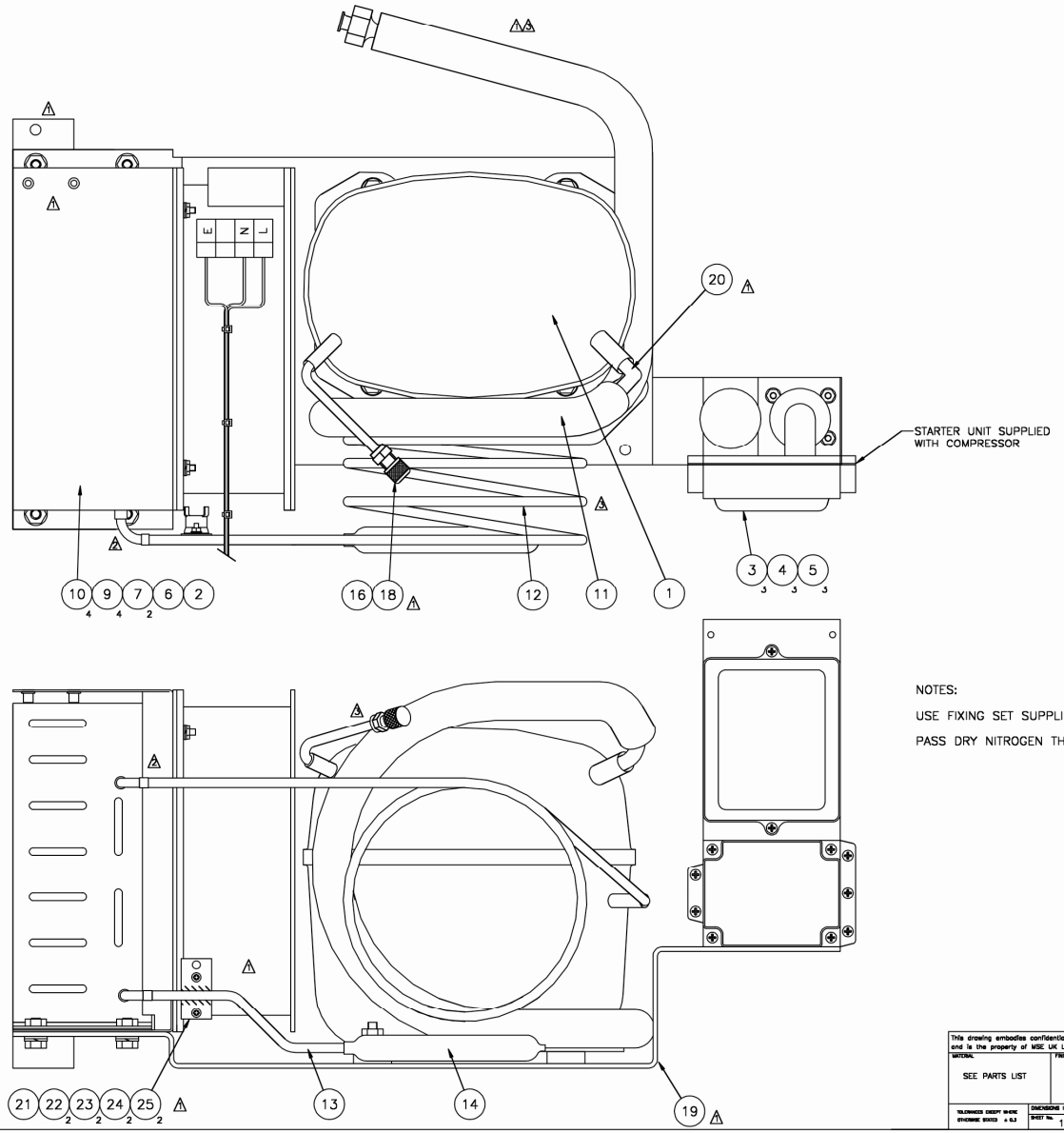
PART No. 66500.1190

DO NOT SCALE THIS DRAWING

Drawing Number: 66500-1199

ITEM	PART No.	QTY	DESCRIPTION
1	31070.017	1	R404a COMPRESSOR 240V/50Hz
2	66500.1203	1	CONDENSER FAN COWLING ASSEMBLY
3	13160.400	3	WASHER M4 PLAIN
4	13360.400	3	M4 SPRING WASHER
5	12260.400	3	NUT M4 HEX
6	96501.076	1	MODIFIED CONDENSER
7	96500.496	2	CLAMP PLATE
9	11460.620	4	M6 x 20 HEX HEAD
10	13360.600	4	M6 SPRING WASHER
11	96500.997	1	HP LINE PIPE H/E END
12	96500.998	1	HP LINE PIPE COMP. END
13	96500.999	1	DRIER LINE PIPE
14	78050.013	1	FILTER DRIER/15g R134a
16	79060.062	1	CHARGING UNION
18	96501.051	1	PROCESS PIPE
19	96500.996	1	REFRIGERATION CHASSIS
20	79060.043	1	COPPER BEND
21	37070.003	1	COMPRESSOR THERMAL CUTOUT
22	11060.310	2	SCREW M3 x 10 PAN HEAD
23	12260.300	2	NUT M3
24	13160.300	2	WASHER M3
25	13260.300	2	WASHER M3 S/P

REMOVE ALL BURRS AND SHARP EDGES



NOTES:

USE FIXING SET SUPPLIED WITH COMPRESSOR.

PASS DRY NITROGEN THROUGH SYSTEM WHILE BRAZING.

3	97-424	MBG		21.10.97
2	97-342	JB	RH	15.7.97
1	97-258	SD	ZI	12.5.97
No.	REVISIONS	DRAWN	CHECKED	APPROVED DATE

THIRD ANGLE

FILE

APPROVED ZI 1.4.97

CHECKED SD 1.4.97

DRAWN MBG 1.4.97

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MATERIAL: SEE PARTS LIST

FINISH: CLEAN

FIRST USED ON: FALCON 6/300 INTRODUCED ON SPEC. No. 96-010

TITLE: REFRIGERATION CHASSIS ASSY.

TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 0.5

DIMENSIONS IN mm

SHEET No. 1 OF 1 A1

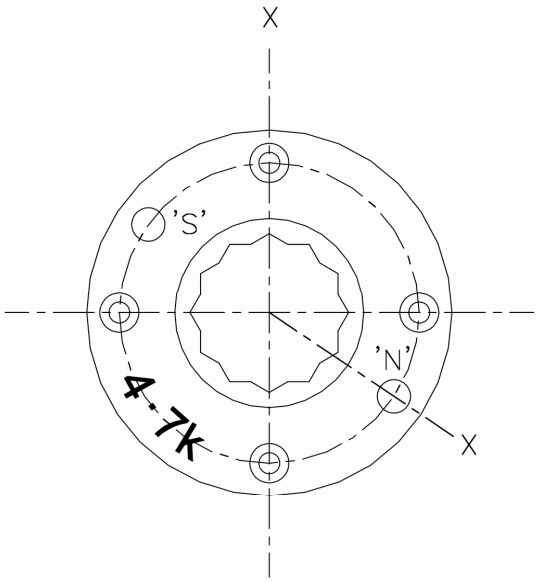
SCALE 2:3

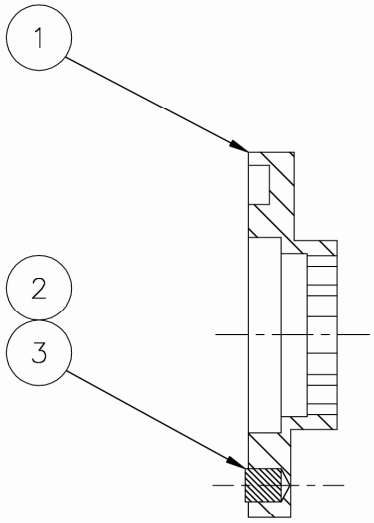
PART No. 66500.1199

DO NOT SCALE THIS DRAWING

Drawing Number: 66500-1233

ITEM	PART No.	QTY	DESCRIPTION
1	81900.536	1	DRIVE SPIGOT 4.7k
2	76500.012	2	MAGNET
3	16200.015	0.001	LOCTITE 648





SECTION X–X

NOTE:
BOND MAGNET (ITEM 2) INTO DRIVE SPIGOT (ITEM 1) ENSURING MAGNETS ARE FLUSH WITH OR JUST ABOVE THE SURFACE.

IMPORTANT: ENSURE PROTRUDING FACE OF MAGNETS ARE THE POLARITY SHOWN

THIRD ANGLE

FILE

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No.	REVISIONS	CHECKED	APPROVED	DATE

APPROVED PM 05.11.06

CHECKED PM 05.11.06

DRAWN MBG 12.2.98

MATERIAL: SEE PARTS LIST

FINISH: NATURAL

TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 0.3

DIMENSIONS IN mm

SHEET No. 1 OF 1 | A4

SCALE 1:1

FIRST USED ON: FALCON 6/300 INTRODUCED ON SPEC No. 98–006

TITLE: DRIVE SPIGOT ASSY. 4.7k

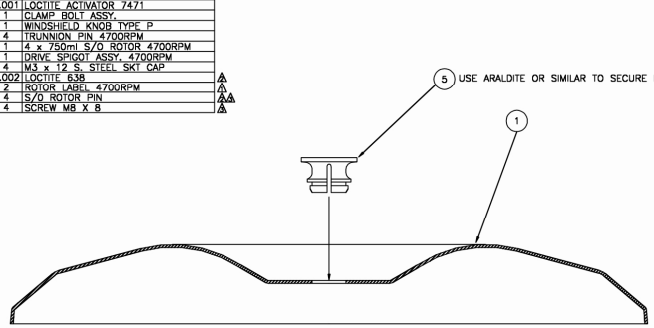
PART No. 66500.1233

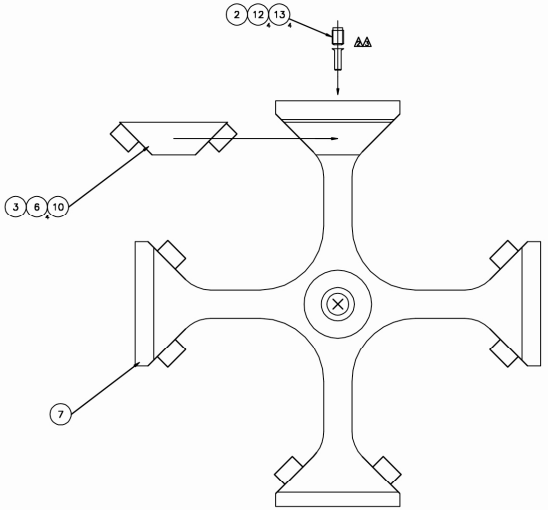
DO NOT SCALE THIS DRAWING

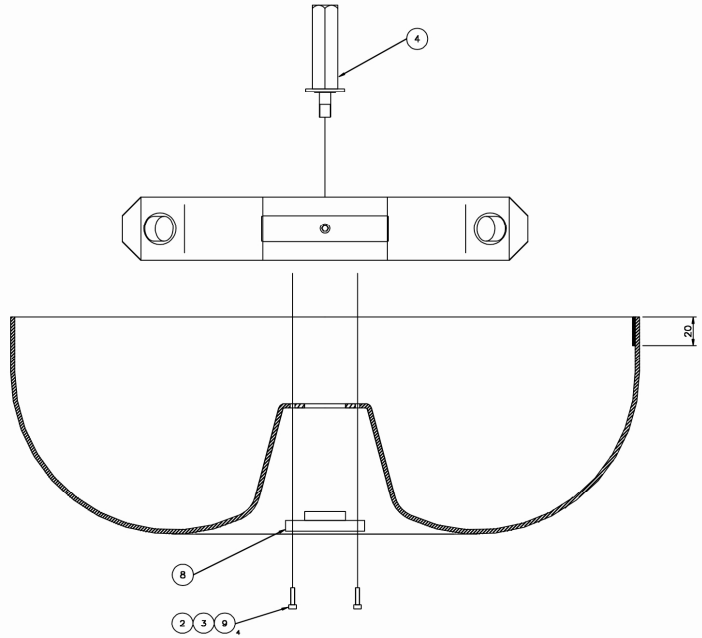
Drawing Number: 66500-1234

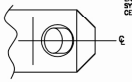
ITEM	PART No.	QTY	DESCRIPTION	
1	96501.053	1	WINDSHIELD & LID FINISH	
2	23400.014	0.001	LOCTITE SCREW LOCK 222E	
3	16200.011	0.001	LOCTITE ACTIVATOR 7471	
4	66500.1190	1	CLAMP BOLT ASSY.	
5	88000.100	1	WINDSHIELD KNOB TYPE P	
6	87130.135	4	TRUNNION PIN 4700RPM	
7	81900.533	1	4 x 750ml S/O ROTOR 4700RPM	
8	66500.1233	1	DRIVE SPIGOT ASSY. 4700RPM	
9	11670.312	4	M3 x 12 S. STEEL SKT CAP	
10	16200.017	0.002	LOCTITE 638	⚠
11	71100.1441	2	ROTOR LABEL 4700RPM	⚠
12	87110.391	4	S/O ROTOR PIN	⚠⚠
13	11560.808	4	SCREW M8 X 8	⚠

REMOVE ALL BURRS AND SHARP EDGES









NOTES

1. LOCATE WIND SHIELD (ITEM 1) AND ROTOR (ITEM 7) OVER SPIGOT (ITEM 6) AND SECURING WITH SCREWS (ITEM 9) AND LOCTITE (ITEMS 2 & 3.)
⚠ 2. PUSH FIT KNOB (ITEM 5) INTO WINDSHIELD LID, USING ARALDITE OR SIMILAR TO SECURE INTO POSITION.
3. CHECK BALANCE OF THE ROTOR ASSEMBLY (WITHOUT BUCKETS OR PINS.)
4. NOTE LOCATION AND DEGREE OF IMBALANCE. REDUCE IMBALANCE BY FITTING TRUNNION PINS OF DIFFERENT MASS TO IMPROVE WEIGHT DISTRIBUTION.
⚠ 5. LOCTITE TRUNNION PINS WITH LOCTITE 638 (ITEM 10) & ACTIVATOR IMPORTANT – THE PINS MUST LIE CENTRAL TO THE ROTOR ARM.
⚠⚠ 6. INSERT ITEM 12 & 13 INTO THE END OF EACH ROTOR ARM AND THRU THE TRUNNION. USE THREADLOCK ON EACH ROTOR PIN.
7. RECHECK BALANCE WITH BUCKETS TO ENSURE IT IS LESS THAN 1 GRAM AT 140mm RADIUS.
8. CORRECT IMBALANCE BY ATTACHING CORRECTIVE BALANCING WEIGHTS TO INSIDE OF WINDSHIELD BODY (INDICATED) USING COLDWELD ADHESIVE.
9. PAINT CORRECTIVE WEIGHTS TO MATCH LID & WINDSHIELD.
10. AFTER BALANCING, MARK WITH MASKING TAPE THE POSITION OF THE MINIMUM OUT-OF-BALANCE MASS ON THE OUTSIDE FACE OF THE WINDSHIELD, THIS MARK WILL BE REQUIRED BY THE TEST DEPARTMENT LATER.
11. ROTOR AND WINDSHIELD TO BE PACKED AS AN ASSEMBLY.
12. MAXIMUM ROTOR SPEED IS 4700 RPM WHEN USED ON THE FALCON 6/300 CENTRIFUGE RANGE.
⚠ 13. PRINT 2 OFF ROTOR LABELS (ITEM 11) WITH THE ROTOR SERIAL No. AND KEEP WITH ROTOR (FIXED TO ROTOR AND LID AT GA STAGE DURING ROTOR/MACHINE MATCHING PROCEDURE.)

THIRD ANGLE
FILE
APPROVED IA 17.2.98
CHECKED MSC 17.2.98
DRAWN IAA 09/02/98

⚠	ECN 01-052	BGL		23.4.01
⚠	ECN 00-191	ML		17.8.00
⚠	ECN 98-143	LAA		15.5.98
⚠	ECN 98-106	MBC	RH	3.4.98
No.	REVISIONS	CHECKED	APPROVED	DATE

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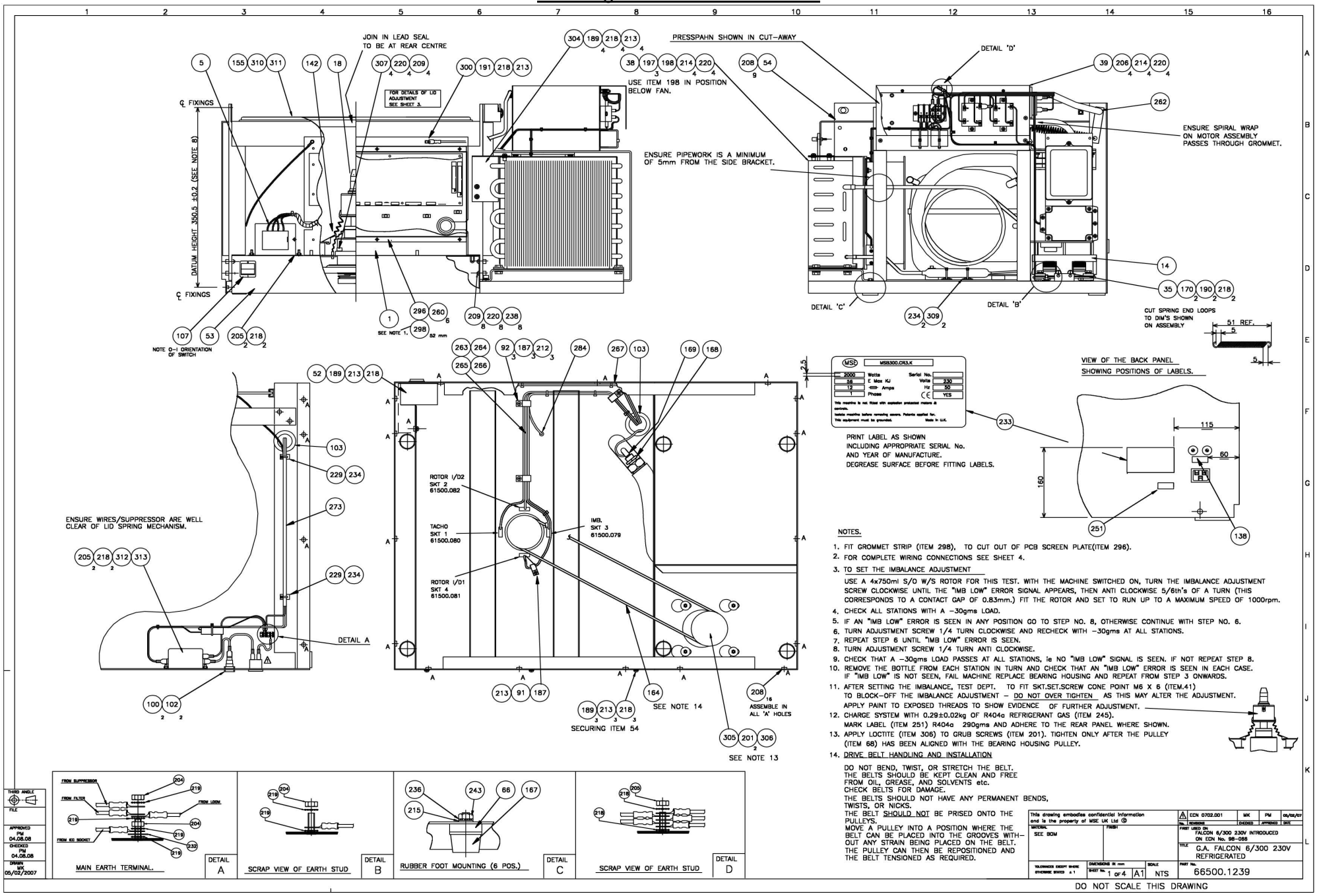
MATERIAL: SEE PARTS LIST
FINISH: CLEAN
FIRST USED ON: FALCON 6/300 INTRODUCED ON SPEC. No. 98-006
TITLE: 4 x 750 ROTOR ASSY – 4.7K
TOLERANCES EXCEPT WHERE DIMENSIONS STATED ± 0.2
DIMENSIONS IN mm
SHEET No. 1 OF 1 | A1
SCALE 1:1.5
PART No. 66500.1234

DO NOT SCALE THIS DRAWING

Drawing Number: 66500-1239


JOIN IN LEAD SEAL TO BE AT REAR CENTRE
FOR DETAILS OF LID ADJUSTMENT SEE SHEET 3.
℄ FIXINGS
DATUM HEIGHT 350.5 ±0.2 (SEE NOTE 8)
℄ FIXINGS
NOTE O-I ORIENTATION OF SWITCH
SEE NOTE 1.
52 mm
PRESSPAHN SHOWN IN CUT-AWAY
USE ITEM 198 IN POSITION BELOW FAN.
ENSURE PIPEWORK IS A MINIMUM OF 5mm FROM THE SIDE BRACKET.
DETAIL 'C'
DETAIL 'B'
DETAIL 'D'
ENSURE SPIRAL WRAP ON MOTOR ASSEMBLY PASSES THROUGH GROMMET.
CUT SPRING END LOOPS TO DIM'S SHOWN ON ASSEMBLY
51 REF.
5
5
ENSURE WIRES/SUPPRESSOR ARE WELL CLEAR OF LID SPRING MECHANISM.
DETAIL A
ROTOR I/D2 SKT 2 61500.082
TACHO SKT 1 61500.080
ROTOR I/D1 SKT 4 61500.081
IMB. SKT 3 61500.079
SEE NOTE 14
SECURING ITEM 54
ASSEMBLE IN ALL 'A' HOLES
SEE NOTE 13
MSE
MSB300.CR3.K
2000 Watts
E Max KJ
12 Amps
1 Phase
Serial No.
Volts 230
Hz 50
CE YES
PRINT LABEL AS SHOWN INCLUDING APPROPRIATE SERIAL No. AND YEAR OF MANUFACTURE. DEGREASE SURFACE BEFORE FITTING LABELS.
VIEW OF THE BACK PANEL SHOWING POSITIONS OF LABELS.
115
60
160

NOTES.

1. FIT GROMMET STRIP (ITEM 298), TO CUT OUT OF PCB SCREEN PLATE(ITEM 296).
2. FOR COMPLETE WIRING CONNECTIONS SEE SHEET 4.
3. TO SET THE IMBALANCE ADJUSTMENT
   USE A 4x750ml S/O W/S ROTOR FOR THIS TEST. WITH THE MACHINE SWITCHED ON, TURN THE IMBALANCE ADJUSTMENT SCREW CLOCKWISE UNTIL THE "IMB LOW" ERROR SIGNAL APPEARS, THEN ANTI CLOCKWISE 5/6th's OF A TURN (THIS CORRESPONDS TO A CONTACT GAP OF 0.83mm.) FIT THE ROTOR AND SET TO RUN UP TO A MAXIMUM SPEED OF 1000rpm.
4. CHECK ALL STATIONS WITH A −30gms LOAD.
5. IF AN "IMB LOW" ERROR IS SEEN IN ANY POSITION GO TO STEP NO. 8, OTHERWISE CONTINUE WITH STEP NO. 6.
6. TURN ADJUSTMENT SCREW 1/4 TURN CLOCKWISE AND RECHECK WITH −30gms AT ALL STATIONS.
7. REPEAT STEP 6 UNTIL "IMB LOW" ERROR IS SEEN.
8. TURN ADJUSTMENT SCREW 1/4 TURN ANTI CLOCKWISE.
9. CHECK THAT A −30gms LOAD PASSES AT ALL STATIONS, ie NO "IMB LOW" SIGNAL IS SEEN. IF NOT REPEAT STEP 8.
10. REMOVE THE BOTTLE FROM EACH STATION IN TURN AND CHECK THAT AN "IMB LOW" ERROR IS SEEN IN EACH CASE. IF "IMB LOW" IS NOT SEEN, FAIL MACHINE REPLACE BEARING HOUSING AND REPEAT FROM STEP 3 ONWARDS.
11. AFTER SETTING THE IMBALANCE, TEST DEPT. TO FIT SKT.SET.SCREW CONE POINT M6 X 6 (ITEM.41) TO BLOCK-OFF THE IMBALANCE ADJUSTMENT – DO NOT OVER TIGHTEN AS THIS MAY ALTER THE ADJUSTMENT. APPLY PAINT TO EXPOSED THREADS TO SHOW EVIDENCE OF FURTHER ADJUSTMENT.
12. CHARGE SYSTEM WITH 0.29±0.02kg OF R404a REFRIGERANT GAS (ITEM 245). MARK LABEL (ITEM 251) R404a 290gms AND ADHERE TO THE REAR PANEL WHERE SHOWN.
13. APPLY LOCTITE (ITEM 306) TO GRUB SCREWS (ITEM 201). TIGHTEN ONLY AFTER THE PULLEY (ITEM 68) HAS BEEN ALIGNED WITH THE BEARING HOUSING PULLEY.
14. DRIVE BELT HANDLING AND INSTALLATION

    DO NOT BEND, TWIST, OR STRETCH THE BELT.
    THE BELTS SHOULD BE KEPT CLEAN AND FREE FROM OIL, GREASE, AND SOLVENTS etc.
    CHECK BELTS FOR DAMAGE.
    THE BELTS SHOULD NOT HAVE ANY PERMANENT BENDS, TWISTS, OR NICKS.
    THE BELT SHOULD NOT BE PRISED ONTO THE PULLEYS.
    MOVE A PULLEY INTO A POSITION WHERE THE BELT CAN BE PLACED INTO THE GROOVES WITHOUT ANY STRAIN BEING PLACED ON THE BELT. THE PULLEY CAN THEN BE REPOSITIONED AND THE BELT TENSIONED AS REQUIRED.

THIRD ANGLE
FILE
APPROVED PM 04.08.08
CHECKED PM 04.08.08
DRAWN MK 05/02/2007

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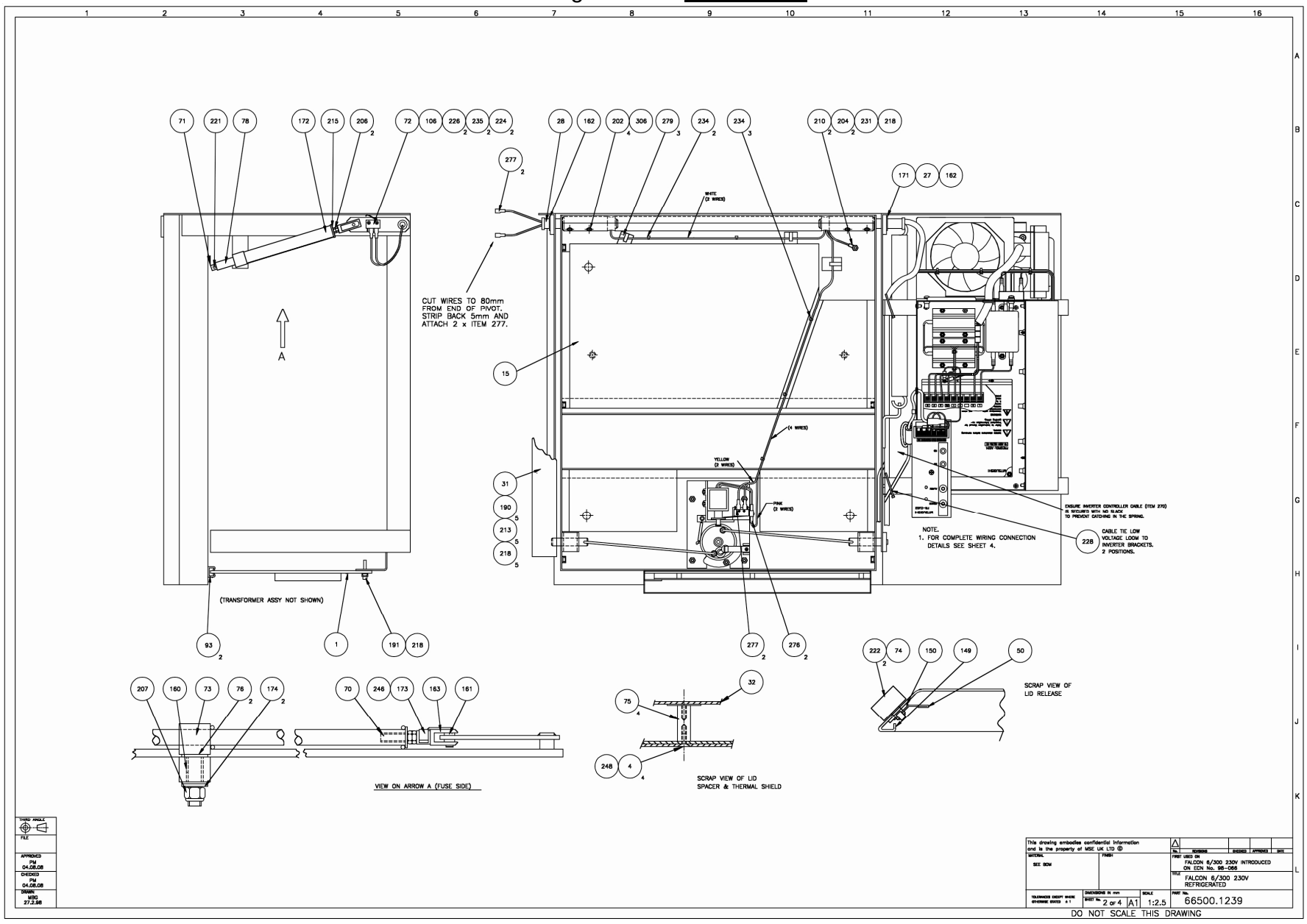
A	ECN 0702.001	MK	PM	05/02/07
No.	REVISIONS	CHECKED	APPROVED	DATE

MATERIAL: SEE BOM
FINISH:
FIRST USED ON: FALCON 6/300 230V INTRODUCED ON ECN No. 98-088
TITLE: G.A. FALCON 6/300 230V REFRIGERATED
TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 1
DIMENSIONS IN mm
SHEET No. 1 OF 4
A1
SCALE: NTS
PART No. 66500.1239

DO NOT SCALE THIS DRAWING

Drawing Number: 66500-1239


CUT WIRES TO 80mm FROM END OF PIVOT. STRIP BACK 5mm AND ATTACH 2 x ITEM 277.
(TRANSFORMER ASSY NOT SHOWN)
NOTE.
1. FOR COMPLETE WIRING CONNECTION DETAILS SEE SHEET 4.
ENSURE INVERTER CONTROLLER CABLE (ITEM 270) IS SECURED WITH NO SLACK TO PREVENT CATCHING IN THE SPRING.
CABLE TIE LOW VOLTAGE LOOM TO INVERTER BRACKETS. 2 POSITIONS.
VIEW ON ARROW A (FUSE SIDE)
SCRAP VIEW OF LID SPACER & THERMAL SHIELD
SCRAP VIEW OF LID RELEASE
WHITE (2 WIRES)
YELLOW (2 WIRES)
PINK (2 WIRES)
(4 WIRES)

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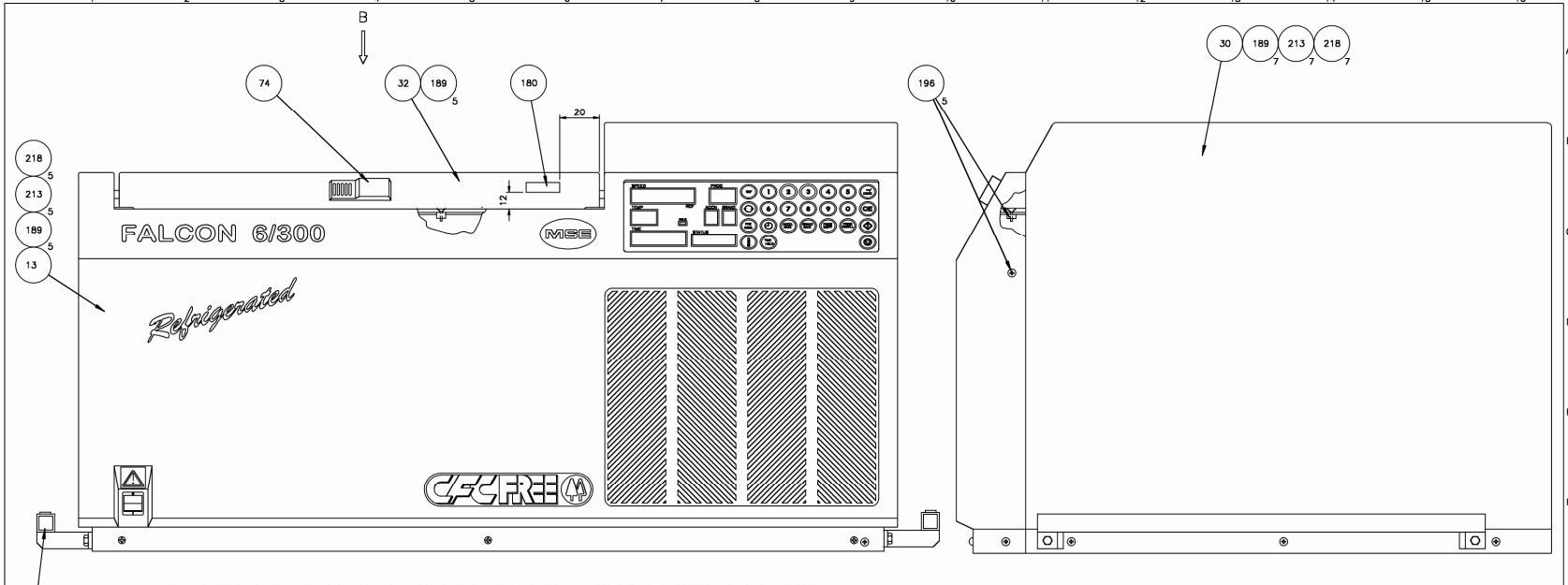
MATERIAL: SEE BOM	FINISH	FIRST USED ON: FALCON 6/300 230V INTRODUCED ON ECN No. 08-066	
TOLERANCES EXCEPT WHERE OTHERWISE STATED ± 1	DIMENSIONS IN mm	SCALE: 1:2.5	PART No.: 66500.1239
	SHEET No. 2 OF 4 A1	TITLE: FALCON 6/300 230V REFRIGERATED	

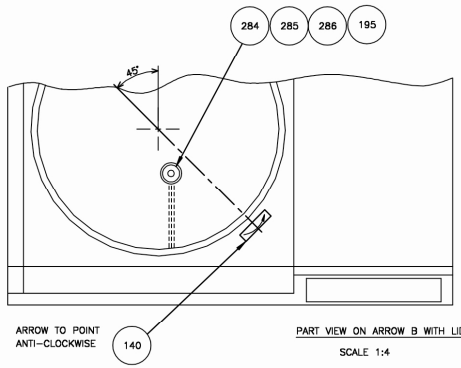
THIRD ANGLE | FILE | APPROVED PM 04.08.08 | CHECKED PM 04.08.08 | DRAWN MDG 27.2.98

DO NOT SCALE THIS DRAWING

Drawing Number: 66500-1239



NOTE: TOLERANCE BUILD UP MAY RESULT IN A 2mm GAP BETWEEN ITEM 13 & BASE. THE GAP SHOULD BE CONTROLLED USING ITEM 227
–DO NOT USE FIXING SCREWS TO ADJUST GAP



PART VIEW ON ARROW B WITH LID REMOVED

SCALE 1:4

NOTES:–

1) PUSH ITEM 160 INTO ITEM 73 AND PUSH ITEM 161 INTO ITEM 28.
2) ASSEMBLE ITEMS 70 AND 163 USING LOCTITE RETAINING GRADE (ITEM 246).
3) WITH LID ASSEMBLY COMPLETE ADJUST INITIAL COMPRESSION OF ITEM 172 WITH ITEM 206 TO HOLD LID JUST FULLY OPEN.
4) ADJUST PRESSURE APPLIED BY ITEM 174 SUCH THAT WHEN LID IS OPENED SLOWLY UNTIL IT ACCELERATES DUE TO SPRING FORCES, IT WILL BE DAMPED TO COME TO REST AT FULLY OPEN POSITION.
5) CHECK ALL ADJUSTMENTS AND LOCK.
6) REMOVE AND DISCARD INVERTER TOP PLATE ON ASSY.
7) AFTER SETTING DATUM HEIGHT, SPOT AND DRILL THROUGH DOWELL HOLES ø4.0±0.05 INTO BASE AND FIT SPIROL PINS (ITEM 237).
8) COIL EXCESS LENGTH OF ITEM 143 (THERMISTOR WIRE) AT PCB CHASSIS AND TIE WRAP.
9) GATHER ROTOR I/D1,I/D2,TACHO,IMBALANCE & THERMISTOR WIRES AND TIE WRAP TOGETHER AT 5 POSITIONS (APPROX. EQUIDISTANT). ATTACH RESULTING ASSEMBLY TO PCB CHASSIS AT 3 POSITIONS.
10) GATHER ITEM 262 (LOW VOLTAGE LOOM) AND ITEM 270 (INVERTER CONTROLLER CABLE) TOGETHER USING TIE WRAPS (5 OFF). PASS THE RESULTING CABLE ASSY THROUGH GROMMET ITEM 10 ON THE PCB CHASSIS AND SECURE USING TIE WRAPS (2 OFF)
11) ALL TIE WRAP POSITIONS NOT DIMENSIONED TO BE PLACED APPROXIMATELY AS SHOWN ON THE DRAWING.
12) ENSURE APPROPRIATE SURFACES ARE DEGREASED PRIOR TO FITTING LABELS.

THIRD ANGLE
FILE
APPROVED PM 04.08.08
CHECKED PM 04.08.08
DRAWN MSC 27.2.98

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MATERIAL: SEE BOM
FINISH:

FIRST USED ON: FALCON 6/300 230V INTRODUCED ON ECN No. 98-088

TITLE: G.A FALCON 6/300 230V REFRIGERATED

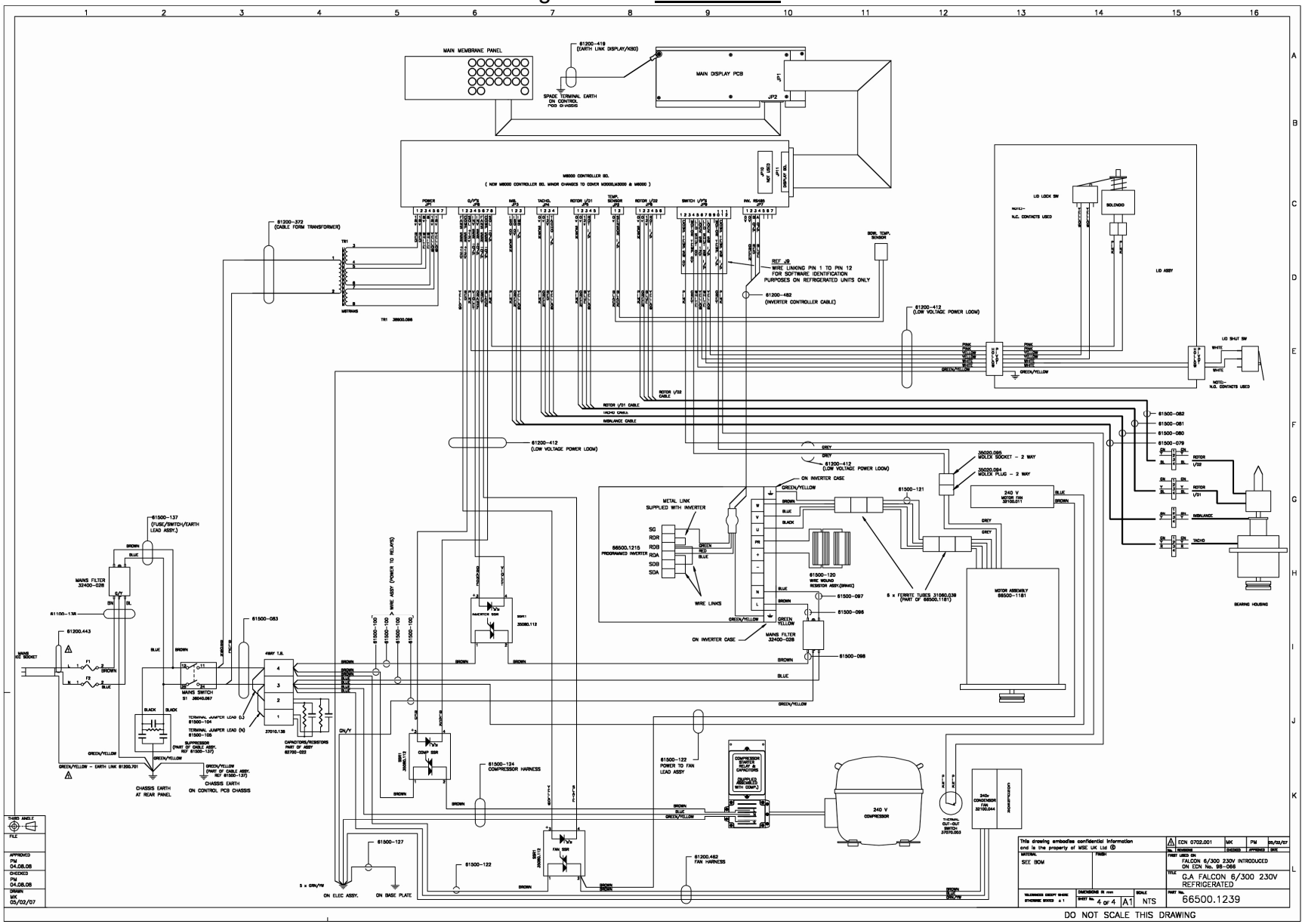
TOLERANCE EXCEPT WHERE OTHERWISE STATED ± 1

DIMENSIONS IN mm | SHEET No. 3 OF 4 | A1 | SCALE NTS

PART No. 66500.1239

DO NOT SCALE THIS DRAWING

Drawing Number: 66500-1239



MSE (UK) LTD

Worsley Bridge Road, Lower Sydenham
London SE26 5AZ
United Kingdom
Tel: +44 (0) 870 609 4097
Fax: +44 (0) 208 650 8408
E-mail: sales@mseuk.co.uk
Web: www.mseuk.co.uk